FLIGHT
and
The AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (50 lines).

8-10, CORPORATION ST., COVENTRY.	GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2.	260, DEANSGATE, MANCHESTER, 3.	26B, RENFIELD ST., GLASGOW, C.2.
Telegrams: Autocar, Coventry. Telephone: Coventry 5210.	Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).	Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.	Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0. 6 months, 16s. 6d. 3 months, 8s. 6d.
Other Countries: Year, £1 10 0. 6 months, 18s. 0d. 3 months, 9s. 0d.

No. 1607. Vol. XXXVI. OCTOBER 12, 1939. Thursdays, Price 6d.

The Outlook

The Lull

WHATEVER may happen in the future (and unexpected things may happen before these words are published), this war has not started off in the way foretold by nearly every prophet. When the air-raid warning sounded on Sunday, Sept. 3, before everybody knew that this country was at war, the prophets seemed to be justified. Germany, they had said, would immediately launch a savage attack on the civil population of London, and that warning was accepted as the expected thing. However, up to date no German aircraft have crossed the coast of Great Britain, while, on the other hand, the Allied aircraft have confined their attentions to the German Fleet, the battle front and rear, and to reconnaissance and propaganda flights over Germany. Of air attacks on German munition works we have heard no report.

Of course, in the first month of the war a large part of the *Luftwaffe* was engaged in Poland. Taking the average of varying reports, it seems likely that about 2,000 German aeroplanes of all descriptions were employed there, and perhaps about 200 of them were destroyed by the Poles, a loss of roughly ten per cent. The quiescence of the *Luftwaffe* on the western front has been ascribed to a desire of Hitler not to provoke popular resentment in Britain and France until he had made his "peace offer," which, such as it was, was made in his speech to the Reichstag. At the same time the consideration must not be overlooked that German training schools cannot turn out pilots so fast as their factories can turn out aeroplanes, and that the loss of aircraft crews cannot be quickly made good. The strength of the Allied defences may well have made Göring inclined to hold his hand.

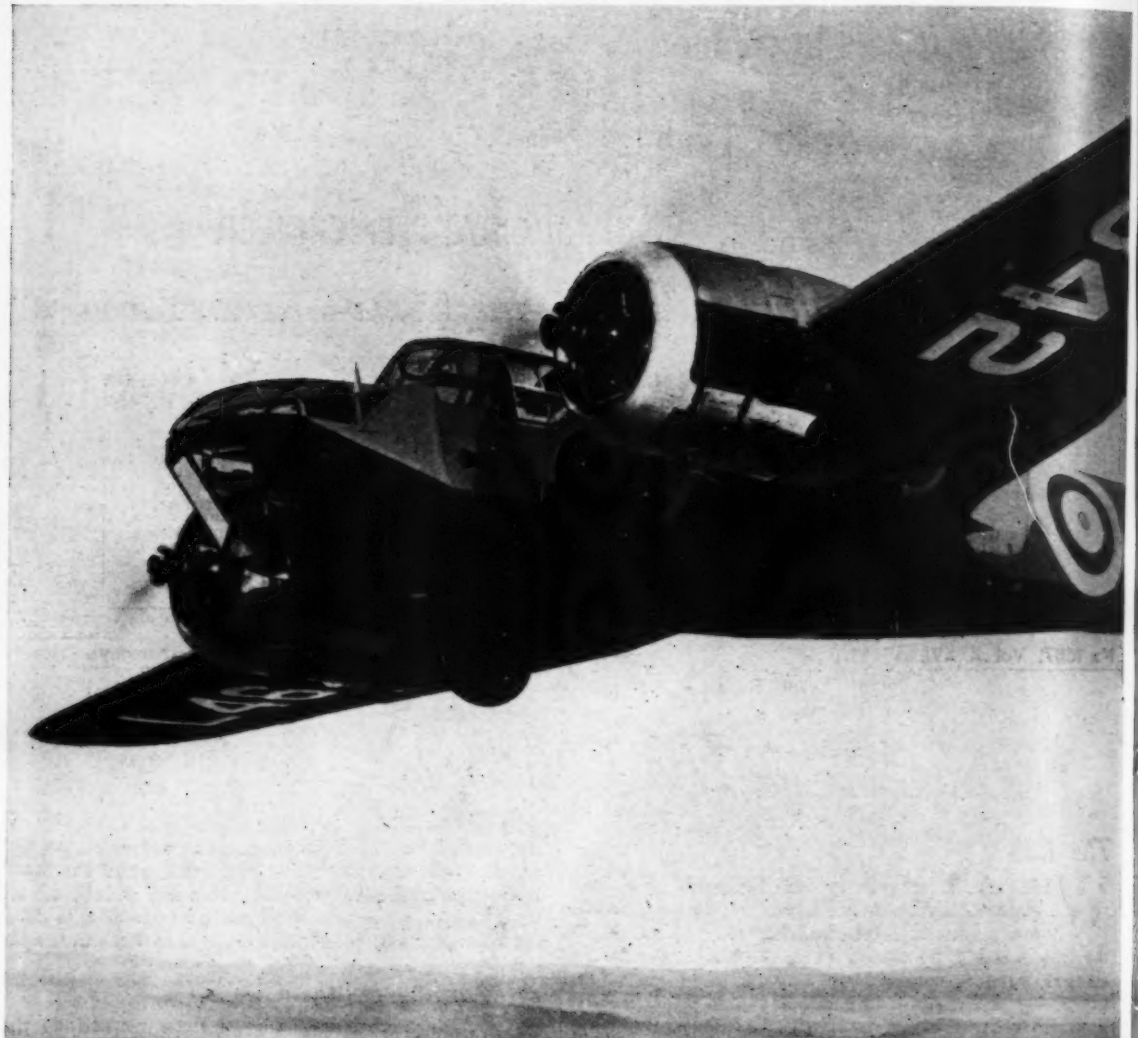
Be that as it may, it is certain that the battle between the two fortified lines on the Franco-German frontier has imperatively claimed the services of the greatest possible air strength on both sides, and even when the active operations of the Armies arrive at a sort of lull, the aircraft on both sides must continue to reconnoitre, to bomb the back areas of the other side, and to fight in the air.

A Warning by the C.A.S.

MANY experienced writers have warned us that when two sides start a war with approximately equal air forces, complete air supremacy by either side is not to be expected. The most that is likely to happen is a temporary and local air superiority, such as was gained by the Royal Flying Corps in the first months of the battles of the Somme. Certainly in the Poland campaign the Germans attained complete mastery in the air and kept it; but then the condition of approximately equal forces at the start had not been fulfilled.

Optimistic writers have lately been asserting that the aircraft of the Allies have established a supremacy on the western front. When such conclusions are drawn by French observers and applied to the R.A.F. we all naturally feel gratified at receiving such compliments from our Allies. The Chief of the Air Staff, Air Chief Marshal Sir Cyril Newall, has warned us all, in sober words expressed with much tact, that it is too early to make such a claim. He prefers to say that the R.A.F. and their Allies are on the road to establishing such a supremacy.

Undoubtedly our air crews have shown the same fighting spirit which their fathers showed over twenty years ago. Added to this, we know that our best aircraft are the best in the world, and that our system of training the pilots and crews is infinitely better than it was in the last war. For the moment our numerous training schools are so full that they can take no more entrants.



BRISTOL BRILLIANCE: In its time the old Bristol Fighter was outstanding among military aircraft. Today the Blenheim carries on the tradition of the "Brisfit." Fast, formidable, a revelation to fly, it has already achieved distinction on active service.

and those who are in a hurry to join in the glorious work are complaining bitterly that they have not been accepted. This state of affairs is of the happiest augury, for it means that there will be no check to the stream of British youth into the R.A.F. The contrast to this bright picture is the knowledge of the very heavy proportion of fatalities which have been suffered in recent years at the German flying schools.

There is as yet no sign that the catch phrase, "The war will be won in the air," is likely to prove true. There is no short cut to victory through one weapon. This war will be won by due co-operation of all arms and all Services. We do not ask our flying Services to perform miracles. All that we ask is that they combine heart and soul with their comrades-in-arms who fight by sea and land. That duty they are doing right well, and the country has no doubts that all three Services, combined with those of France, will fight their way to victory.

Well Done!

IMPERIAL AIRWAYS, the crews of *Caribou* and *Cabot*, Short Brothers, the makers of the two boats, and the Bristol Company, as manufacturers of the Perseus sleeve-valve engines, may well feel proud of the successful achievement of the sixteen transatlantic flights carried out during August and September.

Last week we referred briefly to the fact that the flights had been made "U-boats notwithstanding." This week we are able to publish the plain and unadorned story of the flights as told by Imperial Airways. It is a record of achievement in conditions rendered more difficult by the war. As we pointed out last week, the usual help from ships was not forthcoming, and meteorological information was supplied by one ship only. That in spite of this the flights were made according to schedule speaks well for the airmanship and navigational skill of the crews.

THE WAR in the AIR

Many Adventures : Wise Words from the C.A.S.

German Aircraft in Poland

SOME information about the employment of German aircraft during the invasion of Poland has now reached us from a well-informed Polish source. Our informant was in Warsaw until near the end of the attack on that city, and during his escape from the country by train, car and cart he was bombed no fewer than fourteen times. We may summarise the story he told as follows:—

It was a fact that before the majority of Poles knew that a war was in progress German bombers raided the Polish aerodromes, which, naturally, had taken no precautions. No attempt had been made to hide or distribute the machines, and consequently the German bombers did great damage. This stroke naturally had a very crippling effect upon subsequent Polish operations in the air, though, of course, nothing like the whole of the Polish air service was put out of action, as has been proved by the fact that at the end of the campaign round about 200 Polish machines escaped into Rumania and something like 100 more escaped elsewhere. Of course, these machines were seized by the neutral countries and their crews interned. After the raid on the aerodromes the Germans, as has been described before, dashed ahead with their motorised columns ; their aircraft preceding them and acting as scouts in advance and on the wings. The German spy system in Poland was excellent, and the German commanders seemed to know better than the Poles themselves of every contemplated Polish move or concentration in order to deliver a counter-attack. The German aircraft attacked these concentrations.

Poland is a country with comparatively few railways and roads and the bombing of stations and cross-roads naturally had a disastrous effect on Polish movements. Our informant could make no estimate of the number of German aircraft employed along the fighting fronts of Europe. When the attack on Warsaw began there did not seem to be many German bombers employed. Numbers, in fact, were not necessary, as a few machines were able to fly over, drop their bombs, return to their landing grounds and load up again. Warsaw, of course, had no balloon barrage and there was, consequently, nothing to prevent the Germans from flying low. The number of anti-aircraft guns round Warsaw was estimated at under 100, possibly only 60, and they naturally could do very little against the low-flying Germans. Some toll of the Germans was taken by the Polish fighter pilots, who attacked with the utmost gallantry, but a number of these were shot down by the German bombers. It was remarked that the German bomb-aimers seldom hit the precise building for which they seemed to be aiming, but, none the less, the bombs fell in the city and did other damage. During the first part of the attack there were never more than 30 German aircraft seen at one time over the city, though later on more may have been used. As the Germans closed in round the city they brought their heavy artillery into action, and then more damage was done to the city by the gun-fire than was done by the aeroplanes. On the way from Warsaw to the coast there always seemed to be small numbers of German aircraft overhead flying to and fro, but no large concentrations. It was suggested, as a rough estimate, that the Germans lost about 200 aircraft during the invasion of Poland.

ATTEMPTED RETRIBUTION : The Fairey Swordfish which attacked the U-boat that had sunk the freighter *Kafiristan*. Bombs can be seen under the wings. This photograph was taken from the *Atlantic Farmer* which rescued the crew.

The Fight of the Battles

THE Prime Minister in his third review of the progress of the war which he made in the House of Commons on Tuesday, October 3, said: "An account of the heroic combat above the Siegfried Line, in which five Battle aircraft fought fifteen Messerschmitt fighters has already been made public and has attracted the warm admiration of our French allies."

This was the first indication that the British aircraft used in that very gallant fight were of the Fairey Battle type. It has been frequently published in *Flight* that the top speed of the Battle at a height of 15,000ft. is 257 m.p.h. In our last issue it was stated that the Messerschmitt Me 109, fitted with the Jumo 210 engine has a top speed at 13,100ft. of only 285 m.p.h., but when fitted with Daimler-Benz D.B.600 (950 h.p.) engine, the top speed is 323 m.p.h. It is, of course, not certain that all the fifteen German fighters which attacked our formation of five Battles were of the latest and best type of Messerschmitt. Also it is probable that it has become customary on the front to speak of all the best German fighters as Messerschmitts, and we must not overlook the possibility that some of the machines which attacked our formation were of the type Heinkel He 112, which when fitted with Jumo 210 G engine has a top speed of 317 m.p.h., and when fitted with a Daimler-Benz 601 A, is able to work up to 354 m.p.h. In any case it was hardly to be expected that five bombers could hold their own against the attack of fifteen fighters.

The incident recalls a very interesting lecture delivered before the Royal United Service Institution by Group Capt. A. J. Capel on February 1 of this year. In the course of that lecture he stressed the difference between the "tactical reconnaissance" which covers ground up to a limit of fifty miles from the front line troops and which could be carried out by army co-operation squadrons, and "strategical reconnaissance" which starts at the fifty-mile limit and should be carried out by bomber aircraft specially trained for the work up to the limit of their range. With regard to the latter the lecturer said: "It is unlikely that strategical reconnaissance can be carried out with great

THE WAR IN THE AIR (CONTINUED)

regularity, nor is it necessarily desirable that it should be attempted owing to the danger of the reconnaissances being intercepted by enemy aircraft, but continuous inspection of the whole of the enemy's rear lines of communication at infrequent intervals, both by day and by night, and with the help of the camera, should be sufficient to see alterations in the enemy system of supply and strength of forces."

Two reflections are suggested: (1) that the strategical reconnaissance can only be effectively carried out by a squadron specially trained for the work, as it is naturally somewhat different from the more normal work of bombers, and (2) that where circumstances permit it is desirable to use for the strategical reconnaissance the fastest type of bomber available, so as to give the formation the best possible chance of escaping from the attacks of enemy fighters. In this case one of our five machines returned and that in a very battered condition.

The Attack on the British Fleet

A VERY vivid and dramatic account of the attack by German aircraft on the British fleet which was escorting back a damaged submarine was given as a broadcast (and afterwards published in the Press) by "Naval Eye-Witness." Towards the end of the account he used the following words: "An air attack by the enemy bombing 'planes crumpled under the anti-aircraft fire of the cruisers and the attacks of the fighters sent up by the carrier."

This was the first mention of the employment of fleet fighters, and it was probably the first occasion in history on which blood has been drawn by the fighters of an aircraft carrier. It will probably not be the last. The complete failure of all the German dive-bombers is a matter of the greatest satisfaction to all of us on the Allied side of the war. It is the first time that the multiple pom-poms of the Fleet have been in action, and it is certainly worthy of note, and perhaps rather more, that the dive-bombers did not score a single hit on any British ship. This, however, does not mean that dive-bombing by British aircraft on to German ships will be equally ineffective as the anti-aircraft defences on German warships are not in the same category as those on our own.

Turning to the attack on German warships by aircraft of the Bomber Command on September 29, the Prime Minister, in his review of the progress of the war, stated that the Germans had admitted that two of their attacking fighters had been shot down by our bombers. In the Air Ministry's original announcement of this incident no claim to have shot down German machines was made. It is consoling to know that the losses were not all on one side. We lost men, but they died fighting bravely.

On the Western Front

GENERAL SIR EDMUND IRONSIDE, Chief of the Imperial General Staff, accompanied by Air Chief Marshal Sir Cyril L. N. Newall, Chief of the Air Staff, visited France on Friday, October 6, and had an interview with General Gamelin, the French Commander in Chief, General Vuillemin, Commander of the Armée de l'Air, and General Georges. The French official communiqué stated: "This meeting showed once more the complete identity of views existing between the two commands." After the meeting Sir Cyril Newall gave an interview to the Press in which he said that he had had most amicable discussions with the French staff leaders and that this was the third meeting he had had with them. He went on:—

"The R.A.F. is now well settled in France, with 'planes of every description—fighters, bombers and observation squadrons. Some units are with the British Field Force, and some are working with the French Army. Lots more are coming later.

"Nor must the strength of the R.A.F. be underestimated. French air circles, who are always generous in their praise of the deeds of their British Allies, have given it as their opinion that the R.A.F. have established a supremacy in the air on the Western Front. It is too early to say whether this is so or not. Rather one should say that the R.A.F. and their Allies are on the road to establishing such a supremacy.

"While the R.A.F. are working out their own plans of operations, constant touch is maintained with the French. Generally, Anglo-French co-operation may aptly be said to run to three places of decimals. This extremely close co-operation and liaison between the British and French Air Forces and the French Army is a factor which augurs well for the successful prosecution of the war.

"There is one thing, however, which cannot fail to impress the French about the R.A.F., and that is their modesty. So modest are some of the R.A.F. that it might be believed that, being the youngest Service, they are still a little shy. One thing is certain—heroics of any kind are hated. There are some descriptions of themselves which the R.A.F. dislike heartily. 'Bird man' is one of them. Too much publicity must have worried some of them."

An "Eye-witness" reports, in rather sensational language, a story which he got from an R.A.F. air gunner in hospital. We doubt if the airman really said "diving up":

"We were a handful of British 'planes out on a reconnaissance flight over the Siegfried Line. The Germans spotted us almost at once, and their A.A. batteries opened fire, but we went up well above 20,000ft. and continued our work. We were three in the 'plane, the pilot, the observer and myself as gunner. It was a wonderfully clear day and we could see for miles. There were no clouds anywhere and all Germany stretched beneath us. Suddenly we saw enemy 'planes swirl up towards us from far down below. They were Messerschmitts—three formations of six each. We were outnumbered by more than three to one, but we prepared to give battle. The enemy began with their favourite tactics of diving up at us from underneath, machine-gunning as they came.

A GOOD SHOT: A Messerschmitt fighter brought down by French A.A. guns when about to attack an R.A.F. reconnaissance formation over Germany. The figure in the triangle on the side means that fuel of 87 octane was used in the engine.

THE WAR IN THE AIR (CONTINUED)

Then one of the 'planes attached itself to the tail of my machine and a terrific duel began. I could hear the bullets ripping through the fabric beside me. I looked round and saw the observer in a crumpled heap in his seat. He had been shot through the head. The enemy were using incendiary bullets, and suddenly I realised that it was only a question of seconds before the flames reached me. Then, just as my clothing began to smoulder, the 'plane behind us swooped up and offered me a lovely target. I gave him all I had got, and as the flames blazed up into my face I just had time to see him go into a spin and disappear down beneath me. If I hadn't been on fire I could have easily shot down two more. It was real bad luck. But my pals accounted for three besides the one I hit.

"Half unconscious I started to struggle out of my cockpit. I must have pulled the string of my parachute, for I suddenly saw it open and felt myself dragged out of the plane. I got a nasty blow on the leg from the tail of the machine and then for a moment I suppose I fainted. Next I remember floating down while the battle continued above me. I knew it was Germany below me, and I began to calculate whether there was any hope of the wind carrying me over to the French lines. It seemed very doubtful. I saw a German aerodrome below me, but I couldn't identify it. Then, when I had got quite low, I heard firing, and realised that bullets were whistling near me. I was above the German lines and they were shooting at me. It was a terrible situation, but I saw that there was just a hope that I might get right past the German lines before I landed. They went on firing at me almost until I was on the ground. I released my parachute and started to crawl desperately to a little thicket in the hope of hiding there. There was a wood on one side and flat country on the other where the Germans had their lines. I saw the Germans leave their trenches and come running towards me. I thought I was done for. Then suddenly I saw that men were running from the wood as well. I recognised them as French Algerian soldiers. Both sides were racing for me. Most of the French began to fire at the advancing Germans, but one man came running straight towards me as hard as he could go. He picked me up, slung me over his shoulders, and staggered with me into the woods. I was safe but it was a very near thing. The pilot of my plane did not have to jump out until a little later and he came down in French territory safely, though very badly burned. The observer must have died at once. He was shot right through the head."

A Tactical Reconnaissance

Three R.A.F. aircraft have surveyed nearly twenty miles of the Westwall at a height of about 1ooft. Throughout the whole of this exploit they were fired at only once, by an ordinary machine gun, and they took a most valuable series of photographs of the German fortifications. The leader of the formation, a Flight Lieutenant, told "Eye-Witness" what he had seen.

"Most of all," he declared, "I was impressed by the obviously unfinished state of the Siegfried Line. It was absurdly easy to pick out, because the grass has not yet had time to grow again over the scarred earth. In many places we saw mounds of freshly thrown-up earth and white patches where they had been burrowing in the chalky soil. At the same time, however, we saw no one actually at work on it. We saw parked lorries, cows in fields, a train in a station, and many of the signs of ordinary life, but no one about except soldiers."

The Flight Lieutenant spoke of curious unidentifiable mounds and pits and emplacements in fields and woods; strangely large barns all of the same pattern, on the outskirts of villages; peculiar experiments in camouflage technique; suspicious-looking new buildings and concrete turrets, and sometimes what might have been complete dummy villages.

The bringing down of a German flying-boat by a North Sea patrol of the R.A.F. was announced in the following Air Ministry statement on Monday, October 9th:—"The pilot of a British reconnaissance aircraft on patrol over the North Sea observed an enemy flying-boat. He dived towards it, and the two joined action with bursts of machine-gun fire. A second enemy flying-boat appeared and took part in the engagement. Shortly afterwards two more British reconnaissance aircraft came on the scene. The British aircraft quickly gained the upper hand. The first enemy flying-boat slipped out of the fight and fell into the sea. Its companion made off. Two of the British aircraft were struck by bullets, but neither was damaged. There were no casualties among the British crews. After the combat the pilot of one of the R.A.F. aircraft saw the German crew in the sea, clinging to the wreckage of their flying-boat. A ship in the vicinity was directed to the rescue and our aircraft resumed its patrol."

Two British airmen, Sqn. Ldr. S. S. Murray and P/O A. B. Thompson, who have been reported as "Missing, Believed Prisoners of War," have been recognised in a newsreel illustrating a German internment camp. We reproduce a photograph cut from the newsreel in this issue.

Three unknown British pilots shot down in a fight with German airmen were buried with military honours at a small village near Osnabrück, according to the German newspaper *Voelkischer Beobachter*. At the graveside a German squadron leader gave a short address.

"Soldiers of the English Air Force," he said, "we do not know your names or ranks, so that at last you find peace on German soil in the same way as you fought, that is as unknown men. We know only one thing—that you fought heroically for your country until you died for it. Death ends all enmity, and German soldiers honour and pay homage to every foe. In testimony of our homage I herewith place on your graves a wreath on behalf of the German squadron."

Gen. Stendemann, commanding air defences in West Germany, was asked at a Press conference why our leaflet-dropping aircraft escaped the guns. He said that they usually flew in cloudy weather.

PRISONERS OF WAR: Sqn. Ldr. S. S. Murray and P/O A. B. Thompson in the camp at Itzehoe, chatting with German N.C.O.s. They were shot down by A.A. guns over Thuringia.

Topics of the Day

CONVERSION I.

"Indicator," as a Small Compensation for the Horrors of War, Samples One or Two Military Types

WELL, the amateurs are being used, or some of them, and, eventually, all the suitable ones. A certain lucky few, as an experimental batch, have recently been learning to fly military types so that they can ferry them, thus leaving more experienced Service pilots to do the work for which they are better suited.

From a Chilton to a Battle or Blenheim is a bit of a jump, but the first of the batch appear to have made the grade with fair success. The pity is that this conversion course business was not started a few months ago; we should then have been ready to start work immediately after the war broke out.

Anyway, it is great fun, and when some Superbly Expert instructor, after you've made a few ragged circuits in a Blenheim, says, "Off you go," you wonder what Capt. Lamplugh would say if he had the job of insuring the machine. The aforementioned S.E. instructor *should* know, and he is (one hopes) a good psychologist. These modern military types, flown light and in normal conditions, are quite straightforward, provided only that you work by rule and not by guess.

Drill is the great thing. Nothing must be forgotten. When you have a machine which will not, reasonably enough, take off with the airscrews in coarse pitch or with the flaps down, and which cannot be held down on the climb with the trim in the engine-off approach setting, then some code system of memorisation is essential.

Systematic Procedure

At the Central Flying School they have certainly got this business properly worked out, and not until now have I realised the importance of such a system (its detail character can be left to personal preference), the very real necessity for getting rid of undercarriage drag at the earliest possible moment, or the vital importance of reaching single-engined flying speed in the case of twins. Given an aerodrome of reasonable size there is not a single second during which engine failure should cause more than superficial damage.

The Lockheed 14, for instance, can be held straight and will actually climb at any speed in excess of 120 m.p.h. Obviously, therefore, this speed should be reached as soon as possible, and, in fact, *has* been reached almost as soon as one's hand has left the undercarriage retraction lever, provided that the machine is not allowed to climb as soon as it leaves the ground.

If an engine fails in a machine like the Blenheim, speed, again, is of paramount importance. It is much better to be flying at 120 m.p.h. with the fuselage two feet from the ground than to be flying at 90 m.p.h. a thousand feet up. You can't recover from a spin at that height, but you *can* climb at 120 m.p.h. Our instructors at C.F.S. had no qualms (or showed none) about closing a throttle and switching off when the machine was just off the ground with the undercarriage up. They contour-chased patiently while the speed rose from 110 to 120 m.p.h. and then climbed gingerly. Load apparently makes very little difference—there is ample power provided that the critical rudder control speed has been reached.

But that is by the way. I really intended to write in a vague sort of way in this and, perhaps, a later page of comment about the reactions of a purely civil pilot to one or two military types—or, more correctly, to new complications coupled with anything up to sixteen hundred horse-power. For a start, neither the power nor the high approach and landing speeds made flying in any way more difficult. In fact, high wing loadings make life very much less uncomfortable both in the air and on the ground, and the high power balances the additional weight and size, which are terrifying in prospect rather than retrospect.

That excellent advanced trainer, the North American, or Harvard, gives one an idea of the specialised skill required by an organist, and teaches the important effects of increased g. In other words, it has all the devices which are met in modern aeroplanes, and has sufficiently vigorous elevator control to demonstrate effectively the increase of stalling speed with load; a retractable undercarriage, flaps, a constant-speed airscrew, an exhaust-gas analyser and a flick stall which must be experienced to be believed. Withal, the most delightful of machines—one that, as a millionaire, I should like to own for use when one is feeling especially less old. If you are very bored, all you need to do is to pull the control column back sharply at almost any speed; if normally bored you have lots to play with and look at. After it, the Battle is an old gentleman's aeroplane; it thunders through the sky like a battleship and handles like our overgrown tin Swallow. Fairly harmless, yet surprisingly aerobatic when an expert feels so inclined. The ballast is almost invariably human, and so far off that a reintroduction must be effected after landing.

The Lost Four Hundred

In due course, and before they all rot away, something must be done about the four hundred-odd private owners' machines which are eating their heads off in different parts of the country.

While the unfortunate owners, busy with other matters, are wondering how on earth their machines can be protected from the ravages of boll-weavils and death-watch beetles, the Air Ministry may surreptitiously be planning a savage decree for their removal. So long as the owners, or their proxies, are told *where* to move them and duly given permission to do so, all will be well, but imagine the horror and confusion following a bare order with twenty-four hours' grace. When all this is over, rusted remains of Gipsy Majors and worm-eaten lengths of longeron will be found in various disused barns throughout the country.

The prospect, however, is not as black as all that. There will be use for quite a large number of these machines, and Air Transport Auxiliary will probably see to it that they are collected and duly looked after. In the meantime one can only hope that the owners will be able to find someone to go round with a duster and oil-can from time to time in order to prevent moth and rust from consuming in the ordinary way.

* * *

Once upon a time a test pilot complained of a peculiar rattle in the wing of a certain machine and refused to pass it out until this rattle had been removed. The wing was opened up and inside was found a cup, saucer and a half-eaten ham sandwich. Believe it or not.

INDICATOR.

TO OUR READERS.

We have pointed out on several occasions the advisibility of placing a regular order for FLIGHT with newsagents. It has now become a necessity to do so if readers want to make sure of getting their copies. No copies will be available to the casual purchaser. To make sure of getting your copy every week, place your order immediately with your newsagent.

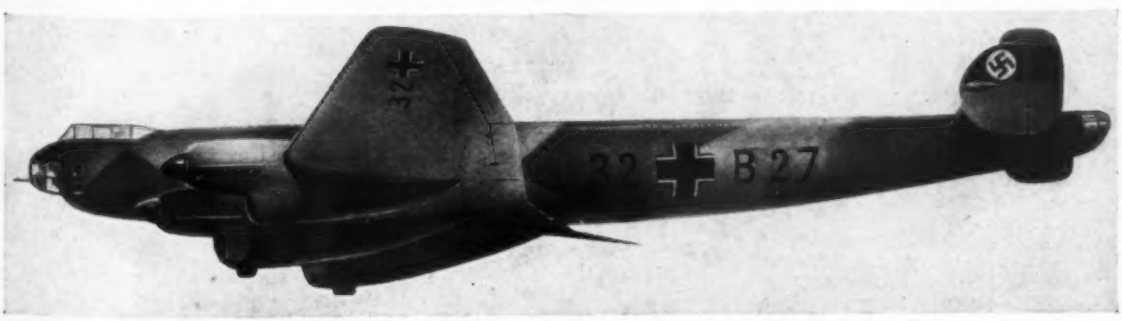
Information on the new Junkers 88 twin-engined bomber is extremely scarce, but it is believed that this drawing is essentially accurate.

The JUNKERS BOMBERS

The New Ju 88 : Diesel Engines in the Ju 86K

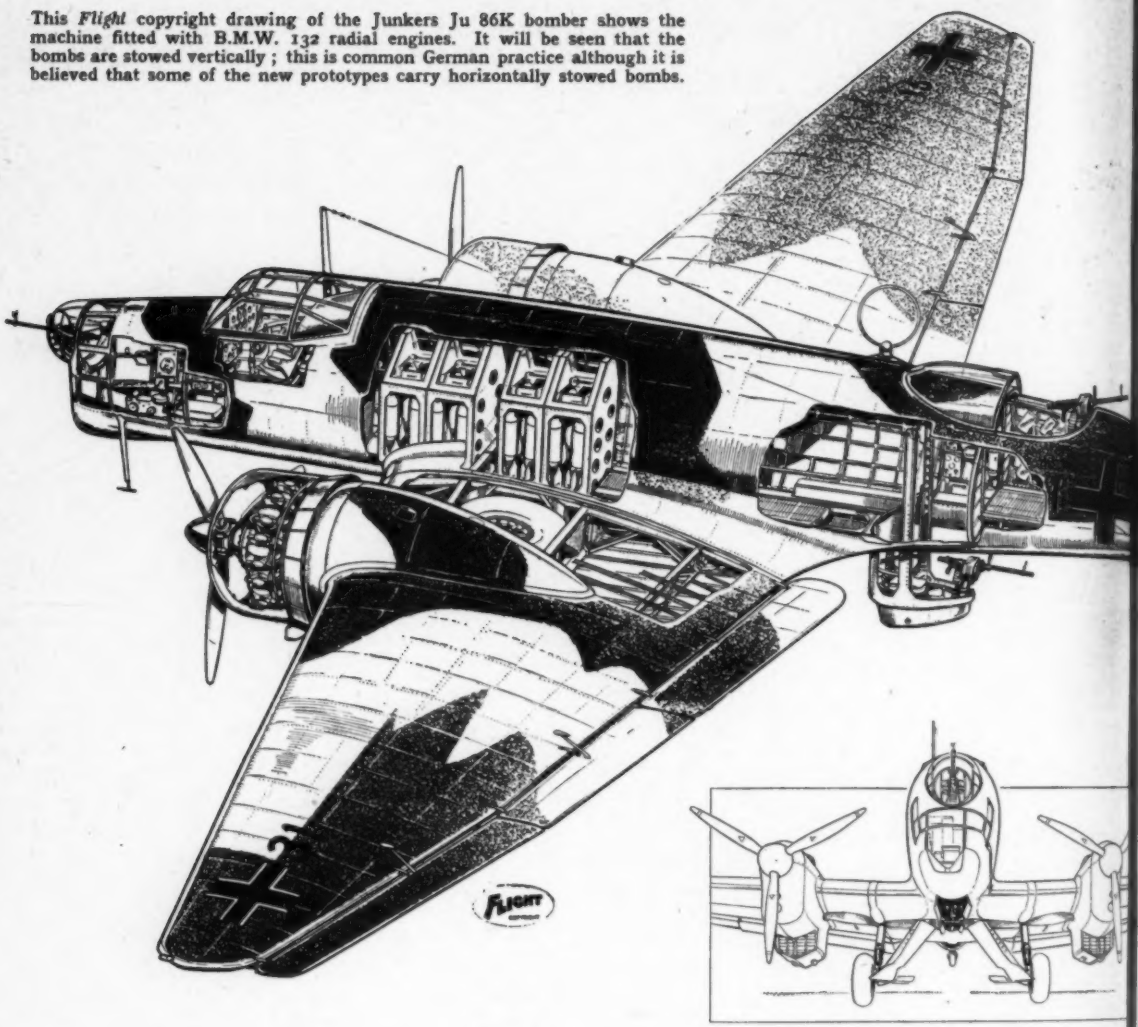
By H. F. KING

PIONEERS in metal construction, the Junkers concern (*Junkers Flugzeug und Motorenwerke, A.-G.*) builds bombing aircraft with some unique structural and aerodynamic features and capable of rapid series production. The latest Junkers bomber, and probably the type which is engaging most of the Junkers production facilities at the present time, is the Ju 88. Information on this machine is scarce. An older type about which a good deal is known, is the Ju 86K; which is still widely used in various forms. The Ju 89 is a very large four-engined



It is known that the Ju 89 shown here appeared as a prototype, and that at least one batch went through the Junkers works, but it is not certain whether any appreciable numbers are in service.

This *Flight* copyright drawing of the Junkers Ju 86K bomber shows the machine fitted with B.M.W. 132 radial engines. It will be seen that the bombs are stowed vertically ; this is common German practice although it is believed that some of the new prototypes carry horizontally stowed bombs.



machine corresponding to the American " flying fortress " formula and the Ju 87 is a specialised single-engined dive bomber. The Ju 87 was described in detail in an article *Germany's Dive-Bombers* which appeared in *Flight* of September 28; it will, therefore, be omitted from this discussion. Ju 52 3ms, generally similar to the machines which have done such outstanding work on the airlines of the world, are operating as training and transport aircraft and are further used for the dropping of parachute troops.

Junkers Ju 88

According to the official bulletin of the Fédération Aeronautique Internationale the record for speed over 1,000 km. with a useful load of 2,000 kg. is held by a Junkers Ju 88 though the *Junkers-Nachrichten* refers to the machine as a Ju 85S. Whatever the precise designation of the aircraft concerned it is certainly similar to a standard type of bomber now going into service in the *Luftwaffe* and commonly known by the works designation Ju 88.

The record referred to was attained on March 19 this year by Ernst Siebert and Kurt Heintz who flew one of the new bombers from the Junkers aerodrome at Dessau to the Zugspitze Mountain and back in 116 minutes, giving an average speed of 517.004 km./hr. (about 321 m.p.h.).

In appearance the Ju 88 is striking as the nacelles hang beneath the low cantilever wing, reminding one of the De Havilland Comet. It is quite a small machine and carries a crew of three. The fuselage is of good aerodynamic form and approximately of oval section though the bottom is flat in the region of the bomb bay. The cockpit enclosure, which opens transversely, is over the leading edge of the wing and the nose of the fuselage tapers sharply and is provided with the usual transparent panels. Cantilever tail surfaces are used and there is a single fin and rudder.

In plan form the wing has been evolved from that of the Ju 86, having a swept-back leading edge. The entire trailing edge is hinged, the inner sections acting as flaps and the outer ones as ailerons.

Perhaps the most interesting feature of the machine is the power-plant installation. The engines are the latest type Junkers Jumo 211 inverted vee-twelves with direct petrol injection and two-speed superchargers. This model gives about 1,200 h.p. for take-off. Airscrews are of the Junkers or V.D.M. constant-speed fully feathering type.

The nacelles are of circular section and the radiator of each engine is of annular form, being housed immediately behind the airscrew, round the reduction-gear housing. This arrangement has been under development for over two years and is used in conjunction with a short radiator duct and controllable gills. Exhaust stubs, which discharge under the wing, are of the rearward-facing type and exert a measure of propulsive force.

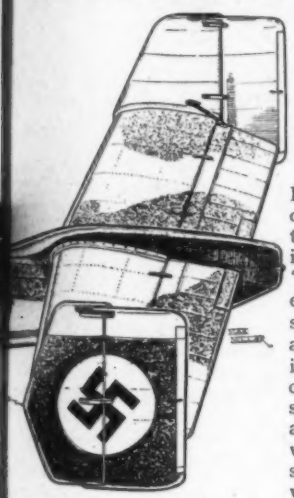
Each half of the undercarriage has two oleo legs and retracts rearward into the nacelles.

Details or armament are unknown, but, being a fairly small machine the Ju 88 could effectively be fitted with fixed guns, say a pair of 20 or 23 mm. shell-guns. Doubtless there are, in addition, rearward-firing or downward-firing machine guns on free manually operated mountings. A typical bomb load would be about 2,500 lb.

Junkers Ju 86K

One of the first of what might be termed modern machines to be introduced into the *Luftwaffe* was a militarised version of the Junkers Ju 86 twin-engined transport monoplane. Known as the Ju 86 K this appeared in 1936.

Structurally the Ju 86 K differs from earlier Junkers machines in that it has smooth stressed-skin covering instead of corrugations. Predominantly oval, the cross-section of the fuselage tapers to a wedge shape as it nears the tail.



The cantilever wing is in three main portions, the outer ends being detachable and fastened to the centre section by ball-joint couplings. There are two main girder spars and one auxiliary member. Large panels of the skin are detachable on the under side to facilitate inspection. Use is made of the Junkers "double wing" which is, in effect, an adjustable subsidiary wing or flap carried aft of the main plane. This improves take-off and landing characteristics and is arranged so that its outer portions serve as ailerons. To avoid damage which might be caused by speeds in excess of that for which the sub-wing is set an "anti-dive" device is incorporated. This is actuated by air pressure and returns the auxiliary wing to the setting appropriate to the speed.

There are four main longerons in the fuselage; these are connected by frames and covered by flush-riveted smooth skin. The tail plane is mounted on a structure just above the fuselage and carries two cantilever fins and rudders. Tail plane and vertical surfaces are of "double-wing" design, the elevators and rudders having trimming tabs.

A striking feature is the undercarriage which appears to be of unconscionably narrow track though it seems to work well enough in service. Even when retracted the gear is inboard of the engine nacelles. It is retracted laterally into the centre-section of the wing by an electric motor and is fitted with sheet-metal fairings to close the apertures for the wheels and struts. Hydraulically operated brakes are provided for the low-pressure wheels.

A number of the Ju 86 Ks in service are fitted with Junkers Jumo 205 heavy-oil engines giving a maximum output of 600 h.p. each for a weight of 1,150 lb. These are very neatly installed and are cooled by radiators slung beneath the rear portion of the nacelles. The airscrews are of the two-pitch Hamilton type of Junkers construction.

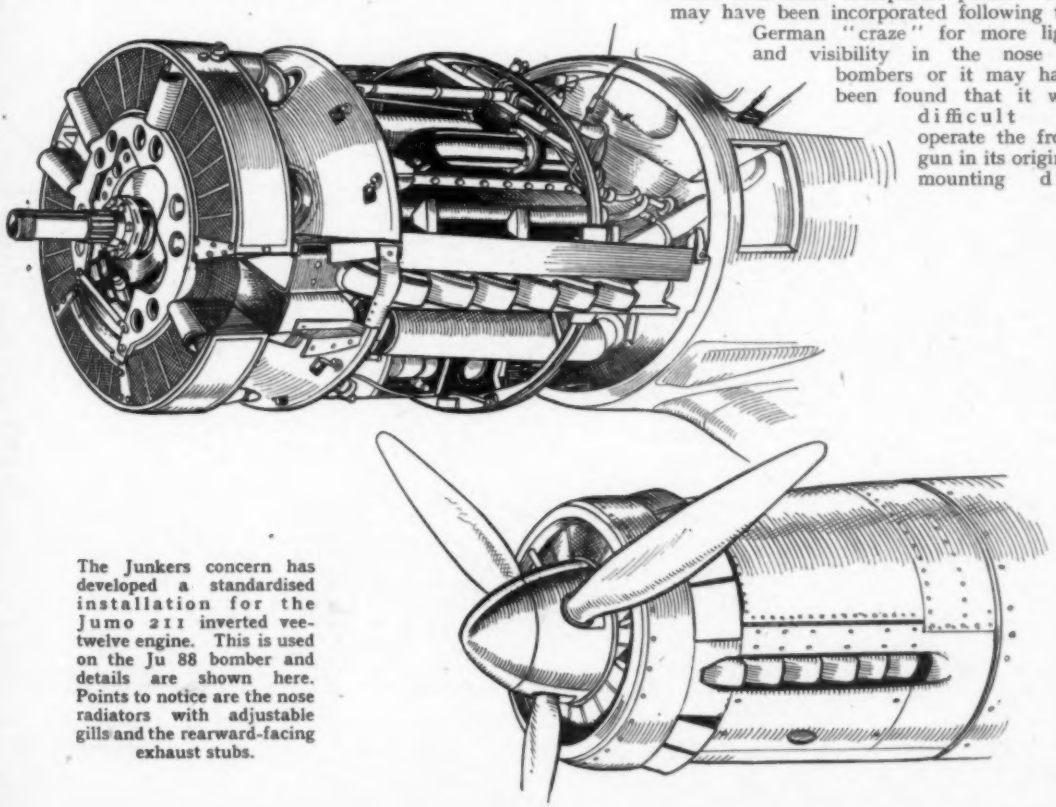
Diesel to Petrol

Although the Jumo 205 is undoubtedly the most successful aero-Diesel ever built, it does not offer the performance attainable with contemporary petrol engines. Consequently we find the later Ju 86 Ks being fitted with the B.M.W. 132 radial which was evolved from the Pratt & Whitney Hornet design. The mark of this engine usually fitted is the 132 Dc, the maximum power of which (available for one minute) is 945 h.p. at 6,560ft. For half an hour it can keep up 790 h.p. at 9,500ft., the maximum output for continuous operation being 655 h.p. at 12,450ft The engine is enclosed in a standard long-chord cowling with controllable gills and drives a two-position or constant-speed Hamilton type three-bladed airscrew.

The normal defensive armament of the Ju 86K takes the form of three standard 7.9 mm. machine guns. One of these is mounted in a spherical manually operated turret in the nose; a second is placed on top of the fuselage, in which position the gunner is sheltered by a large transparent shield; and the third is installed in a semi-retractable "dust-bin" beneath the fuselage. The gun positions are shown in some detail in the accompanying drawing.

Bombs are stowed vertically, tail down, and fall through two sets of traps in the bottom of the fuselage.

It is believed that Ju 86Ks of the final series have a completely redesigned nose which is shorter and is provided with more transparent panels. This may have been incorporated following the German "craze" for more light and visibility in the nose of bombers or it may have been found that it was difficult to operate the front gun in its original mounting due



The Junkers concern has developed a standardised installation for the Jumo 211 inverted vee-twelve engine. This is used on the Ju 88 bomber and details are shown here. Points to notice are the nose radiators with adjustable gills and the rearward-facing exhaust stubs.

Junkers Ju 86Ks going through the Junkers works at Dessau. Production of this type is now believed to have ceased.

to the higher speed attained with the later engines.

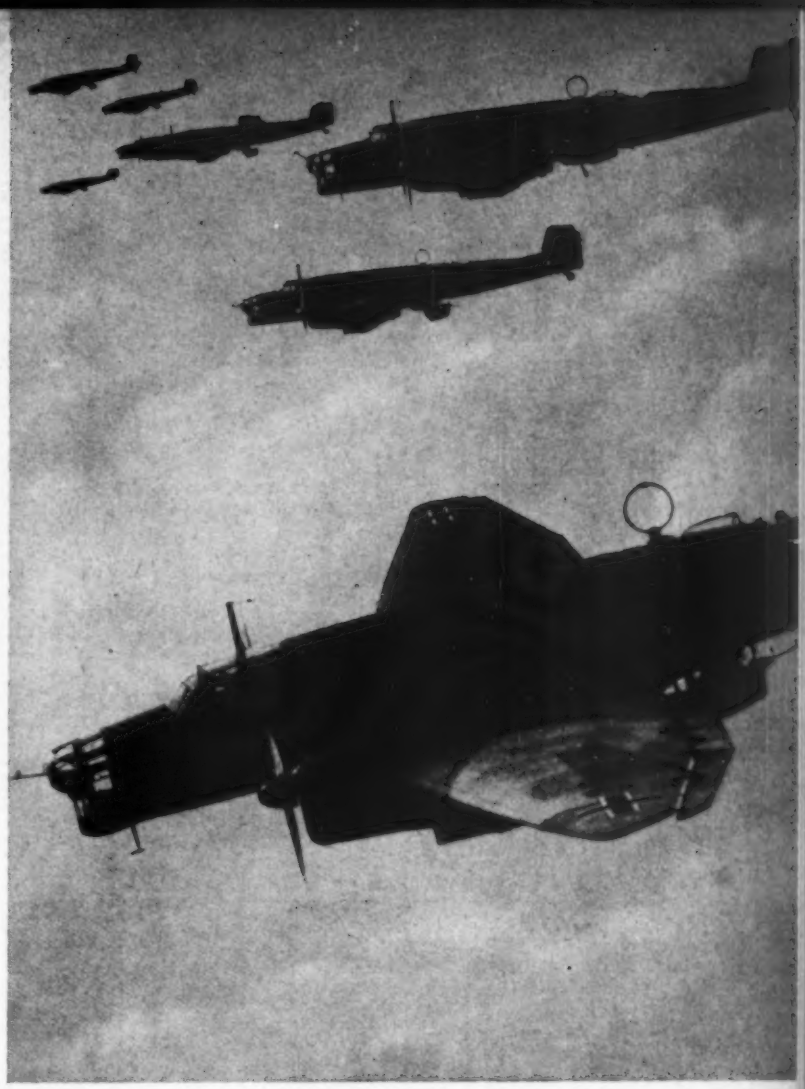
Data for the standard Ju 86K are: Span, 73ft. 9in.; length, 59ft.; wing area, 882 sq. ft.; disposable load, 6,460 lb. The top speed can be little more than 225 m.p.h.

Ju 86Ks have been exported to Sweden and other countries and a demonstration machine was sent to South Africa, though no orders were placed. It is stated that aircraft of this type were employed on the Eastern Front.

Junkers Ju 89

The largest machine in service with the *Luftwaffe* is the Junkers Ju 89 which is essentially similar to the Ju 90 transport. Although it has been reported that the German Higher Command, and especially Generallmajor Ernst Udet, have an aversion to very large bombing aircraft, preferring the high-speed twin-engined types, it is reported that a number of Ju 89s have been delivered to the *Luftwaffe*. Certainly the machine appeared as a

The installation of a Junkers Jumo 205 heavy-oil engine in a Ju 86K bomber. This unit gives a maximum output of 600 h.p. Although bearing the name Jumo, the type 205 bears no relationship to the Jumo 210 and 211 which are inverted vee-twelve petrol engines.



Ju 86Ks powered with Jumo 205 heavy-oil engines in service with the *Luftwaffe*.

prototype, being powered with four of the original Daimler-Benz DB 600 engines, the Junkers concern not then having available its own Jumo 211 engine of comparable characteristics.

An indication of the potentialities of the type was given in June last year, when a Ju 90 with the same engines reached a height of 23,760ft. carrying a load of 22,046 lb. In comparison with the civil machine the Ju 89 is believed to have a fuselage of smaller cross section. It is known that gun turrets are installed in the nose and tail, but it can only be assumed that additional armament is provided amidships. It may be recalled that the Ju 90, which was a frequent visitor to Croydon in pre-war days, has quite a massive section of fuselage extending beyond the tail surfaces; this is probably due to provision made in the design for the installation of the rear turret.

Structurally the Ju 89 is a typical Junkers product, the swept-back main planes incorporating the "double wing" arrangement already mentioned. The centre section has five girder spars of tubular construction; the inner sections have five girder spars of plate construction and two auxiliary spars; while the outer sections have four plate girder spars and three auxiliaries.

The fuselage structure comprises longitudinal stringers and transverse frames and stressed skin covering.

Each half of the retractable undercarriage is mounted under an inboard engine nacelle, these being specially enlarged for the purpose. The tail wheel is also retractable.

Although the prototype Ju 89 had Daimler-Benz engines it is believed that production aircraft have Junkers Jumo 211s (not 210s, as often reported). With either the Junkers or the Daimler-Benz installation the top speed would be considerably more than 200 m.p.h.

It is claimed for the Ju 90 that the top speed can be raised to 280 m.p.h., though the engines specified are not mentioned. Possibly these would be liquid-cooled units of X formation such as are believed to be under development in Germany.

The span of the Ju 89 is 115ft. and the length is probably similar to that of the Ju 90, which measures about 86ft. The maximum take-off weight of the Ju 90 ranges from 50,800 lb. to 57,300 lb., according to engines; it may be assumed that the weight of the Ju 89 is somewhere between these two figures, and that the disposable load is considerably more than 17,000 lb.

It is likely that the Ju 89s are used not only as bombers but as transport machines and for the dropping of parachute troops.

Junkers Ju 52/3m.

In the early days of the *Luftwaffe*, and, for that matter, until the Spanish War was well under way, a standard type of bomber was the Junkers Ju 52/3m. Sometimes the letter K was added to this designation to denote *Kampflugzeug* just as the militarised Ju 86 is known as the Ju 86K. The service version of Ju 52/3m was a direct adaptation of the civil transport type and was extremely popular for its flying qualities though the performance, after the installation of armament, was not brilliant though quite high according to contemporary standards.

The main alterations made to the civil type were the fitting of bomb gear and the installation of upper and lower gun positions, the lower one taking the form of a "dustbin" turret. One gun was fitted to each mounting. It is perhaps not generally known that the Ju 52 layout was planned from the beginning with a view to conversion for military purposes.

As the Ju 52s disappeared from the squadrons they were put into use as training machines and transport aircraft. A number were fitted out as "flying class-rooms," while others were equipped with the necessary static line attachments for the dropping of parachute troops. Due to its good take-off and landing qualities, weight lifting capacity and ability to "rough it," the Ju 52/3m has proved itself admirably suited for operation from advanced places in conjunction with the army.

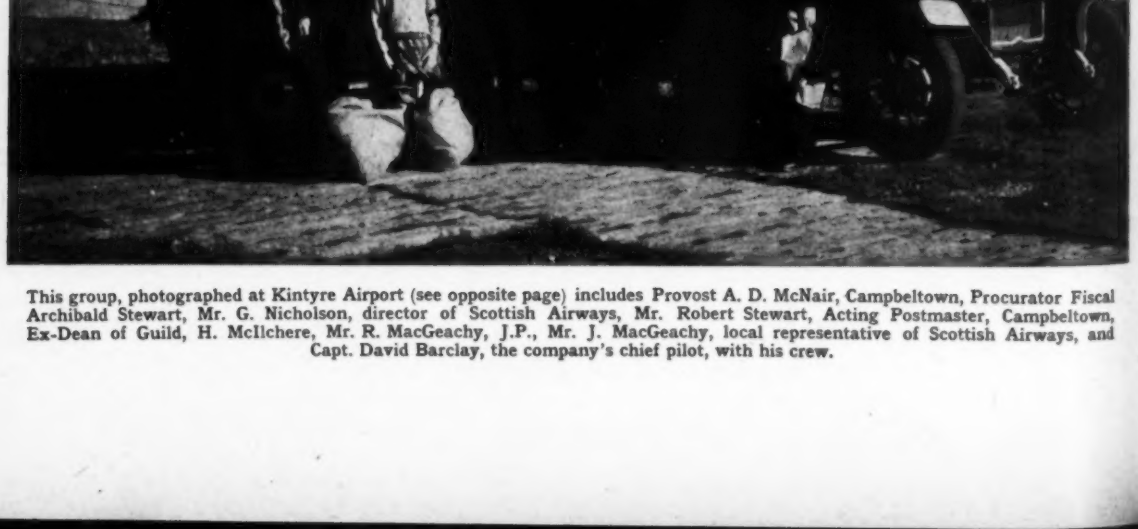
Data for a typical military type Ju 52/3m fitted with B.M.W. 132A engines would be: Maximum speed, 160 m.p.h.; ceiling, 20,000ft.; and range 540 miles. The span is nearly 96ft. and the length 62ft.

The faithful Ju 52/3m is now used for transport training, and for the dropping of parachute troops, as seen here.

THE ROYAL AERO CLUB: AVIATORS' CERTIFICATES

No.	Name	School or Club	Date
20,094	John Bradford Rogers	Luton Flying Club ...	6.9.39
20,095	George Edward Chugg	Redhill Flying Club ...	6.9.39
20,096	Reginald George Langridge ...	Bournemouth Flying Club	7.9.39
20,097	Rosemary Enid Brudenell Bruce	Bournemouth Flying Club	7.9.39
20,098	Harry Clifford Tonge	Bournemouth Flying Club	7.9.39
20,099	Gerald Jack Hamilton	Bournemouth Flying Club	7.9.39
20,100	Leonard Ernest Barnard	Bournemouth Flying Club	7.9.39
20,101	Sidney William Mawson	Bournemouth Flying Club	7.9.39
20,102	John Shirley Shuckburgh ...	University Aero Club ...	7.9.39
20,103	William Percy Lawrence Eagles...	University Aero Club ...	7.9.39
20,104	Lionel Richard Willis	University Aero Club ...	7.9.39
20,105	Robert George Gordon Maiben Marsden	University Aero Club ...	7.9.39
20,106	Philip Charles Hamilton Morris ...	University Aero Club ...	7.9.39
20,107	Kenneth Thompson	University Aero Club ...	7.9.39
20,108	John Somerville McArthur ...	Edinburgh Flying Club ...	7.9.39
20,109	Thomas Fairgrieve Dorward ...	Edinburgh Flying Club ...	7.9.39
20,110	Ralph Gore	Hartlepool and Tees Side Flying Club	7.9.39
20,111	Stuart Douglas James Hay ...	Reading Aero Club ...	7.9.39
20,112	Adam Dixon Hindmarsh ...	Newcastle-on-Tyne Ae. C.	7.9.39
20,113	Herbert James Sanderson ...	Cambridge Aero Club ...	7.9.39
20,114	Norman Alfred Gillham	Cambridge Aero Club ...	7.9.39
20,115	Claude Albert Abbs Rayner ...	Cambridge Aero Club ...	7.9.39
20,116	Kenneth Gordon Mason	Cambridge Aero Club ...	7.9.39
20,117	Louis Walter Wareham	Bournemouth Flying Club	9.9.39
20,118	Leonard Slater	Lancashire Aero Club ...	9.9.39
20,119	Martin Tyringham Stephens ...	Brooklands Flying Club...	11.9.39
20,120	John Dyson Taylor	Brooklands Flying Club...	11.9.39
20,121	Reginald Howard Harrison ...	Airwork Flying Club ...	11.9.39
20,122	Jack Townsend Crawshaw ...	Airwork Flying Club ...	11.9.39
20,123	Stanley Dawson	Airwork Flying Club ...	11.9.39
20,124	Ernest Archie Wollaston	Airwork Flying Club ...	11.9.39
20,125	Thomas William Beckett ...	Airwork Flying Club ...	11.9.39
20,126	John Chappell	Airwork Flying Club ...	11.9.39
20,127	Maurice Holdsworth	Airwork Flying Club ...	11.9.39
20,128	Leonard Ernest Eric Bundock ...	Airwork Flying Club ...	11.9.39
20,129	Walter George Watson	Airwork Flying Club ...	11.9.39
20,130	Colin Fraser Macrae	Airwork Flying Club ...	11.9.39
20,131	Elliot Hughes	Airwork Flying Club ...	11.9.39
20,132	Eric Hubert Isaacs	Airwork Flying Club ...	11.9.39
20,133	Charles George Gilmore	Airwork Flying Club ...	11.9.39
20,134	Basil Kingsley Allen	Plymouth Aero Club ...	11.9.39
20,135	Charles Edward Caldwell... ...	Liverpool and Dist. Ae. C.	11.9.39
20,136	Walter Noel Kenyon	Liverpool and Dist. Ae. C.	11.9.39
20,137	Norman Alfred Steggles	Liverpool and Dist. Ae. C.	11.9.39
20,138	Alastair Michael Adair Majendie...	Liverpool and Dist. Ae. C.	11.9.39
20,139	Joan Winifred Dutton	Liverpool and Dist. Ae. C.	11.9.39
20,140	Roland Aylmer Lloyd	Liverpool and Dist. Ae. C.	11.9.39
20,141	Richard Cedric Young	Liverpool and Dist. Ae. C.	11.9.39
20,142	Frederick Joseph Robinson ...	Liverpool and Dist. Ae. C.	11.9.39
20,143	Norman Cookson	Liverpool and Dist. Ae. C.	11.9.39
20,144	Charles Gordon Todd	Liverpool and Dist. Ae. C.	11.9.39
20,145	Evan Wynn-Evans	Liverpool and Dist. Ae. C.	11.9.39
20,146	Geoffrey Roberts	Liverpool and Dist. Ae. C.	11.9.39
20,147	Robert Russell Scott McAulay ...	Weston Aero Club ...	12.9.39
20,148	Gerald Hugh Austin	Weston Aero Club ...	12.9.39
20,149	George Howard Watkins	Weston Aero Club ...	12.9.39
20,150	Glyn Ivor Curtis	Weston Aero Club ...	12.9.39
20,151	Donald Francis Gillam	Weston Aero Club ...	12.9.39
20,152	Stanley John Wilkins	Weston Aero Club ...	12.9.39
20,153	Kenneth Charles Herbert Rawlings	Worcestershire F.C. ...	12.9.39
20,154	Horace Edward Vertigen... ...	Cinque Ports Flying Club	12.9.39
20,155	Frederick Weir-Willats	Luton Flying Club ...	13.9.39
20,156	Ronald Leslie Stevens	Cardiff Aeroplane Club ...	13.9.39
20,157	Michael Parsons	Oxford Flying Club ...	13.9.39
20,158	Naomi Mary Thornton	County Flying Club ...	14.9.39
20,159	Frank Edward Booy	Cotswold Aero Club ...	15.9.39
20,160	Frederick William Arnold ...	Cambridge Aero Club ...	16.9.39
20,161	Arthur William Thorpe	Cambridge Aero Club ...	16.9.39
20,162	Richard Henry Howard	Cambridge Aero Club ...	16.9.39
20,163	Stephen Michael Alvin Banister...	University Aero Club ...	16.9.39
20,164	Alan Doughty Shuckburgh ...	University Aero Club ...	16.9.39
20,165	Eric Herbert Jones	University Aero Club ...	16.9.39
20,166	Donald Moore	Doncaster Aero Club ...	18.9.39
20,167	Albert Edward Lawton	Doncaster Aero Club ...	18.9.39
20,168	Ronald Denis Wagstaff	Doncaster Aero Club ...	18.9.39
20,169	Philip Goldthorpe	Doncaster Aero Club ...	18.9.39
20,170	Bernard Blackburn	Isle of Wight Flying Club	18.9.39
20,171	Stewart Smith Downie	Strathtay Aero Club ...	18.9.39
20,172	Cecil Harold Cox	Isle of Wight Flying Club	19.9.39
20,173	Francis Steward	West Suffolk Aero Club ...	19.9.39
20,174	Roy Kenneth Orrock	Isle of Wight Flying Club	19.9.39
20,175	Peter Henry Knowler	Isle of Wight Flying Club	19.9.39
20,176	Eric Alfred Fry	Isle of Wight Flying Club	19.9.39
20,177	William Reginald Swinn	Tollerton Aero Club ...	19.9.39
20,178	Kenneth Gill	Tollerton Aero Club ...	19.9.39
20,179	William Halworth Chandler ...	Lincolnshire Aero Club ...	19.9.39
20,180	John Fardell Hay	Isle of Wight Flying Club	20.9.39
20,181	Albert John Chadderton	North Staffs Aero Club ...	20.9.39
20,182	Dennis Belson	North Staffs Aero Club ...	20.9.39
20,183	Arthur John Elson	North Staffs Aero Club ...	20.9.39
20,184	Harry Guy Copestake	North Staffs Aero Club ...	20.9.39
20,185	Victor Thomas Cannon Piggott ...	Cotswold Aero Club ...	21.9.39
20,186	Vasant Rao Hattangady	Air Service Training ...	21.9.39
20,187	Hedley Arthur Williams	Isle of Wight Flying Club	22.9.39
20,188	Harold Frank Perrott	Isle of Wight Flying Club	22.9.39
20,189	Norman John Elliott	Isle of Wight Flying Club	22.9.39
20,190	Cyril George Dunkling	Civil Service Flying Assn.	22.9.39
20,191	David Selwyn Hyauiason ...	Civil Service Flying Assn.	22.9.39
20,192	John King	Liverpool and Dist. Ae. C.	25.9.39
20,193	Stanley Walter Laughton ...	Doncaster Aero Club ...	25.9.39
20,194	Ronald Charles Brockway ...	Cinque Ports Flying Club	25.9.39
20,195	David Henry Roberts	Cinque Ports Flying Club	25.9.39
20,196	Leslie Osmond Evans	Cardiff Aeroplane Club ...	26.9.39
20,197	Aline Helen Rhonie	U.S.A. Commercial Licence	28.9.39

GLASGOW—CAMPBELTOWN AIR MAIL



This group, photographed at Kintyre Airport (see opposite page) includes Provost A. D. McNair, Campbeltown, Procurator Fiscal Archibald Stewart, Mr. G. Nicholson, director of Scottish Airways, Mr. Robert Stewart, Acting Postmaster, Campbeltown, Ex-Dean of Guild, H. McIlchere, Mr. R. MacGeachy, J.P., Mr. J. MacGeachy, local representative of Scottish Airways, and Capt. David Barclay, the company's chief pilot, with his crew.

999 and ALL THAT

"A. Viator" on Myoptic Pilots : A Plucky Air Hostess : A.B.A. and K.L.M. to Reopen Services

I HAVE a sort of feeling that eyesight tests should be stricter in the jolly old *Luftwaffe*. Anyone who cannot distinguish a K.L.M. D.C.3 (shining like silver in the sun and marked all over with the word Holland in enormous letters) from an Allied bomber has either got the breeze up and is suffering from "cold floats," or else he is a silly little man who ought to join poor mentally afflicted Dr. (Heil-Howl) Goebbels in a nice, quiet sanatorium far off the beaten track of those horrid leaflet-droppers.

Amusing, by the way, how the nimble Nazi tried to blame the Dutch pilot for trying to avoid him! What should he have done, I wonder, with a lunatic gunman on his tail? Possibly our Hermann would say that he should have pulled up all standing in mid-air and ridden at anchor until the myoptic Fritz had pulled out his reading spectacles and perused the lettering all over the aeroplane.

The K.L.M. pilot was Capt. Moll, co-pilot of Capt. Parmentier in the Melbourne race, and the air hostess was Miss Annie Wynoldt, to whom I take off my hat for her calmness and courage. She covered up the dead passenger with a rug and said he had fainted, and she chatted to the rest of the passengers quietly and naturally, reassuring them about the "rattling noises," which they did not know, curiously enough, were machine-gun bullets.

I hope the poor German pilot will not be penalised with, for example, one of these new "Ersatz" iron crosses made of cardboard, which melt and dribble down the tunic in a shower of rain.

Rumours

News of commercial interest this week consists of strong rumours that A.B. Aerotransport may, in due course, open up air services between this country and another, and that K.L.M. will shortly reopen services to and from Holland. When I dialled 999, Ministry of Misinformation, they told me that on no account could I mention the place of departure or arrival of these services, but that, after all, I could safely leave the dissemination of these vital secrets to the passengers, who will shortly be travelling to and fro. The official I spoke to was courteous but brief, explaining that he was awfully busy censoring an account of the retreat from Mons in 1914.

Visiting the vicinity of what was once Croydon Airport, Pride of the Metropolis, and Laughing Stock of Europe, I found that it was not, after all, a Government Rabbit Farm, but had been taken over by Minister of Agriculture and Fisheries for the production of essential foodstuffs. Minister of Agriculture was plodding up and down sowing beans, both French and runner, not to mention soya, broad and jumping. The latest variety is known, of course, as the whereaveyou bean.

Close co-operation between the two Ministries, immemorially and inexplicably yoked together since the Norman Conquest (O.K., 999, I'm giving no 1066 secrets of military importance away), was aptly illustrated at Croydon. Close in the footsteps of Minister of Agriculture limped Minister of Fisheries, broadcasting with generous hand certain rich fish manures, as, for example, anchovies on toast, soft roes on ditto, dressed crab and, not very patriotically I thought, lashings of Bismarck herring. It is thought that something will come of all this in due season, if only a crop of the lesser fœtid cats' bane.

As for the swim pool, which was an important clue to the neighbourhood, being unnaturally blue and limpid, it has been covered with a thin layer of sphagnum moss, with daisies stuck all over it. Several important civil servants who went for an evening stroll on its verdant surface are understood to have sunk without trace, and will remain *in situ* for the duration.

I was away up to the Frozen North recently, practically within the Arctic Circle, to see some old friends in the A——r M——istry. You ought to see them, living a life of luxury in commandeered marble halls, with page boys serving tea and fish (brain power) and chips all day long. Up and down the heavily mined staircase, labelled "unsafe," runs an endless stream of spies, pink chits in hand.

One gent's beard came off as he passed down with a wallet full of secret documents, and the porter stopped him. "My dear Baron von-und-zu-Ersatz-Moustachio, if you are not more careful we shall have to take action, though we should hate to lose you," remarked the porter. "Dat'll be O.K., Shorge," answered the Baron. "De spirit gum, he come on stuck, by gum, but I don't let him 'appen again, nein."

With a smartly outthrust hand and a "Heil, Shorge," the Baron tripped away to the nearest telephone booth to ring up 999 Berlin, Ministry of Misinformation. So you see, chaps, though we may be a bit slow, we have got this spy racket fairly closely taped.

Just as I go to press (somewhere in England), late news from a reliable source comes to hand that I am all wrong about the Agricultural and Fishy stuff at Croydon. They now say that Croydon, undulations of surface and all, has been removed piecemeal, sod by sod and concrete block by ditto, to one of the Lesser Hebrides, where, like most evacuees, it is a nuisance to the neighbourhood and extremely discontented with its new surroundings.

I don't altogether vouch for this, but it was from a barmaid with a boy friend who had failed his eyesight test for the R.A.F., who had it from a pal of his whose uncle was in a Highland regiment, and *he* used to know the Hebrides Outer, Inner and Bull, pretty well in the old days.

You see, one has to be a pretty nimble sleuth to get the inside news these days.

A. VIATOR.

GLASGOW-CAMPBELTOWN AIR MAIL

SCOTTISH AIRWAYS, Ltd., on Monday of last week inaugurated the air mail service between Glasgow and Campbeltown. Scottish Airways, who were recently awarded the first contract for the carriage by air of H.M. mail to Kintyre, will deliver first-class mail daily (Sundays excepted) at Campbeltown airport at 10.30 a.m. Mails from Campbeltown will be flown to Renfrew at 12.45 p.m.

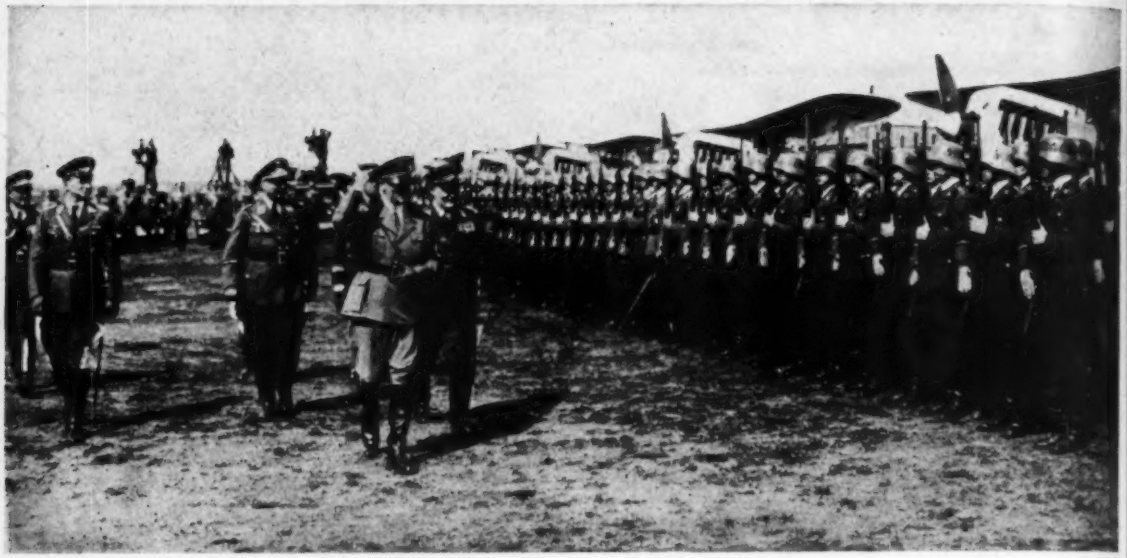
The Royal Air Mail, piloted by Captain David Barclay, chief pilot of the company, took off on Monday with a full complement of passengers and mails. In view of wartime conditions all ceremony was dispensed with, but the plane was warmly welcomed on arrival by Mr. Robert Stewart, acting head postmaster of Campbeltown, and by Provost A. D. McNair.

Scottish Airways, Ltd., also carry H.M. mail between Inverness, Wick and Kirkwall.

Speaking at the ceremony which inaugurated the service at Campbeltown, Provost McNair suggested that the Kintyre airport might become the terminus of the transatlantic air mail. A start, he said, had been made with the air mail service from Glasgow to Campbeltown, and as the plane of Scottish Airways, which carried that mail, proceeded to Islay, in due course he hoped the air mail would be extended to Islay. There were possibilities of enormous future developments, and they were looking forward to seeing some day Campbeltown becoming the first British port of call of the transatlantic air service.

Mr. George Nicholson, resident director of Scottish Airways, said they had been endeavouring for four years to secure the air mail contract for Campbeltown, and he hoped the Islay contract would follow in due course.

Catherine MacGeachy, daughter of Mr. James MacGeachy, Kintyre airport superintendent, presented Mr. Nicholson and Capt. Barclay with silver cigarette cases bearing the Campbeltown coat-of-arms as souvenirs of the occasion.



THE "LUFTWAFFE"

*Growth and Organisation of the German Air Force**

THE Air Force of Germany was not officially constituted until February 26, 1935. While it was then composed of only a few formations consisting of units trained in secret and in a most rudimentary manner during the period of demilitarisation, it became in the span of four years a powerful instrument, which has undergone considerable expansion and has now reached a state of full development.

We are thus able to gain a good knowledge of the preparations, the hesitations and also the modifications which were entailed by the various problems to be solved. The constitution of new units, the progress of their training, their gradual incorporation under the control of qualified headquarter staffs, was not indeed an easy task to perform during such a period of rapid expansion in a country where, in spite of its legendary discipline, "questions of persons" play a very important part.

But—also and above all—a general view of the picture now presented by this organisation will enable us to understand the final goal aimed at by Germany, through all its evolutions, viz.—to possess by 1938—the year which Germany had undoubtedly appointed in advance for the presentation in full daylight of important claims—the instrument required to support her revisionist policy, and for that purpose *to create in peacetime a powerful air force having at its command all such means as would enable it to act immediately* without having to be placed on a war footing first.

Initially this intention was not clearly apparent. The problem was then to design the framework within which the air forces of Germany could develop harmoniously, and the first measures of organisation originally taken were chiefly concerned with questions of training in all its forms and at all its stages.

On March 1, 1935, the Führer officially created the German *Luftwaffe*, which thenceforth was to be, under the orders of Field-Marshal von Blomberg, Commander-in-Chief of all the armed forces of the Reich, the third element of the *Wehrmacht*, side by side with the army and the navy.

Within the *Luftwaffe*, the command was decentralised: five air region commanders exercised full authority over the units stationed there and also over the various territories which, it would appear, had been mapped out more with a view to facilitating training and regional recruiting than for considerations of a military character.

These five air regions corresponded in fact more or less with the boundaries of the old German states: Rhineland provinces, Bavaria, Saxony and Silesia, Brandenburg and Pomerania.

A sixth air region grouped under its authority the whole of the coastal districts of the North Sea and the Baltic, that is to say all the units operating with the Navy, no matter where they were stationed.

The headquarters of these air regions were in fact set up and staffed immediately, and the units were distributed over the territories concerned as and when they were created. Two years later, on April 1, 1937, as the number of units had grown very considerably, a seventh air region came into being. But two main reasons subsequently caused the Führer to introduce important modifications into the original organisation described above.

To begin with, the organisation of the command (whereby Field-Marshal Goering, who was chief of the *Luftwaffe* and—in his capacity of economic dictator under the Four-Year Plan—the second personage in the Reich, was placed in a position subordinate to Field-Marshal von Blomberg) had not been accepted without recrimination.

Besides, this quarrel of precedence was accompanied by a deeper and more general feeling of hostility. The young *Luftwaffe*, created out of nothing, being the work and glory of the régime, was ardently National-Socialist in sentiment and felt itself to be the special arm of the party, so that it was rather restive under the authority of the Reichswehr chiefs, most of whom were hostile to the new régime.

Hitler solved the crisis by a number of sensational retirements and thereupon assumed the title of Commander-in-Chief of the *Wehrmacht*, that is to say of the three fighting services of the Reich—land, sea and air.

Moreover, as the units created in the manner explained above, though not yet perfectly trained, had already received a good preliminary grounding, it was imperative to give the new German Air Force without delay:

(*a*) An orientation which would enable it to face the

* Translated from the French *Revue de l'Armée de l'Air* for July-August, 1939.

TWO ATLANTIC MONTHS

50,000 *Miles at* 145 *m.p.h.*

DESPITE the incidence of war, Imperial Airways completed their scheduled series of weekly services between England, Canada and the United States. The programme allowed for services from the beginning of August to the end of September, and these were duly completed with the arrival of the flying-boat *Cabot* the week-end before last. Its departure from Port Washington was delayed by unfavourable weather.

This, and the 24-hour postponement during the week-end when war actually started, were the only important diversions from schedule on the entire series of sixteen flights. More than 50,000 miles were flown by the two flying-boats at an average ground speed of 145 m.p.h. without a single item of mechanical difficulty, the modified Short "C" class flying-boats with their Bristol Perseus sleeve-valve engines proving satisfactory.

The service was opened on August 5 by *Caribou*, with Capt. J. C. Kelly Rogers in command; it concluded, at the end of September, with the return of *Cabot*, Capt. A. G. Store in command. The latter, on its outward flight during the previous week-end, broke the record for the run between Foynes and Botwood. Capt. Store took 13 hours 2 minutes, as compared with the previous record of 13 hours 22 minutes by the floatplane *Mercury* during the experimental flights of 1938.

As a matter of interest, the following table shows the scheduled and actual times of arrival of the sixteen 1939 flights:—

WESTBOUND

	Scheduled arrival times at New York	Actual arrival times	Remarks
1	Sunday 6 Aug. 23.00 G.M.T.	Monday 7 Aug. 01.46 G.M.T.	2.46 late
2	„ 13 „ 23.00 „	Sunday 13 „ 22.34 „	0.26 ahead
3	„ 20 „ 23.00 „	„ 20 „ 21.29 „	1.31 „
4	„ 27 „ 23.00 „	„ 27 „ 19.40 „	3.20 „
5	„ 3 Sept. 23.00 „	Monday 4 Sept. 20.50 „ (Service postponed 24 hours, due to late arrival of mail at Southampton.)	21.50 late
6	„ 10 „ 23.00 „	Sunday 10 Sept. 22.36 G.M.T.	0.24 ahead
7	„ 17 „ 23.00 „	„ 17 „ 20.55 „	2.05 „
8	„ 24 „ 23.00 „	„ 24 „ 21.58 „	1.02 „

EASTBOUND

	Scheduled arrival times at Hythe/Poole	Actual arrival times	Remarks
1	Friday 11 Aug. 14.00 G.M.T.	Friday 11 Aug. 13.32 G.M.T.	0.28 ahead
2	„ 18 „ 14.00 „	„ 11 „ 12.02 „	1.58 „
3	„ 25 „ 14.00 „	„ 25 „ 15.07 „	1.07 late
4	„ 1 Sept. 14.00 „	„ 1 Sept. 11.42 „	2.18 ahead
5	„ 8 „ 14.00 „	„ 8 „ 11.19 „	2.41 „
6	„ 15 „ 14.00 „	„ 15 „ 14.58 „	0.58 late
7	„ 22 „ 16.50 „	„ 22 „ 16.56 „	0.06 „
8	„ 30 „ 18.00 „	„ 30 „ 17.33 „ (Service postponed 24 hours, due to bad weather at New York.)	0.27 ahead

During the second half of the period the operations were made specially difficult by the lack of meteorological information. With the silencing of ships on the North Atlantic coincident with the outbreak of war, such information, supplied by only one ship, whilst helpful, was not by any means the complete story—which was obtained only during the first four return flights. Another step taken on the outbreak of war was that of giving the position of the boats only by longitude, the latitude being omitted, as the course already set was known to all concerned.

Only on one, the first, westward trip by *Caribou* were weather conditions rather bad, though in three cases it was somewhat unfavourable for the take-off at Port Washington. In only one instance, however, did this delay departure. In fact, *Cabot* actually left when the American flying-boat decided to delay her departure. This was on August 30, and the U.K. mail aboard the P.A.A. boat was transferred to *Cabot*, which took off in a heavy downpour of rain and fought a 54 m.p.h. headwind until Albany was passed. On the ocean span crossing proper, the average height for the eight westward flights was 1,500ft., while, eastbound, an altitude of 8,000 to 10,000ft. was maintained.

The flights gave Canada a 27-hour service with England, and in order that the population of the Prairie provinces and British Columbia could benefit from the speed-up, the times of arrival of *Cabot* and *Caribou* were so arranged that connection was made with Trans-Canada Airlines Fourteens leaving St. Hubert airport, Montreal, for the west.

Freight and mail loads carried on the sixteen trips amounted to about 13,000 lb., that carried eastward totalling about 7,000 lb. and that carried westward approximately 6,000 lb. Fuel consumption per complete return trip averaged 5,500 gallons. Some 800 additional gallons were taken aboard at Foynes and the same amount on the inward trip at Botwood.

Refuelling from the air was regarded as generally satisfactory, though not used, by any means, on all occasions. On the average, the operation took about ten minutes, but in most cases it had the advantage of comparatively favourable weather. The position at Foynes, where the land airport is only a few miles from Foynes, is much better than at Botwood, where the two bases (Hattie's Camp and Botwood) are about forty miles apart. The officers who operated the service were Capts. D. C. T. Bennett, J. W. G. James, J. C. Kelly Rogers, S. G. Long, A. C. Loraine and A. G. Store; First Officers G. H. Bowes, T. H. Farnsworth and B. C. Frost; and Radio Officers E. F. G. Brent, C. L. Cheesman, A. J. Coster, A. A. Hillier, T. E. Hobbs, R. Martin and C. E. Wilcockson.

THE "LUFTWAFFE" (*Continued from page 300h*)

various frontiers of the Reich and the different possible theatres of operations;

(*b*) such an organisation of the command as would facilitate the transfer of the whole force on to a war footing; for in the course of that year—1938—the Reich was determined to bring that force into play in order to secure the satisfaction of its claims.

Such was the main purpose of the organisation decrees of February, 1938, which still govern the German air force and which we will now examine in greater detail.

In the first place, to form an exact idea of the power conferred upon the German Air Force by its present organisation, it is sufficient to give a few precise particulars regarding its composition.

More than any other foreign air force, the German *Luftwaffe* constitutes a coherent whole and combines under a single command not only the forces necessary for the conduct of aerial warfare, both defensive and offensive, but also all sorts of auxiliary services of its own which make it entirely independent.

As a matter of fact, in addition to the aerial forces proper and A.A. artillery, it has its own services for signalling, recruitment, supplies, medical staff, military justice, etc.

As—in wartime—the authority of the Air Minister also extends to the A.R.P. services, it may be said that in Germany it is the same organisation which is responsible for preventing (by bombing operations), detecting (through the look-out services), countering (by the use of the fighter squadrons and the A.A. batteries), and restricting (by the application of A.R.P. measures) the activities of an enemy air force.

It will be readily understood that such a complex organisation, exercising so widespread an authority and of so recent a creation, was more or less bound to experience a crisis due to its growth having been too rapid.

(*To be concluded next week*).

HOW to BECOME a WAR PILOT

Three Classes of Entry

FLIGHT has been receiving a number of letters from correspondents anxious to enter the flying Services and uncertain how to set about it. For the benefit of all such we are able to explain the position as it exists at the moment.

In the first place the Air Ministry is not now granting any permanent commissions or any of the ordinary short-service commissions for four or six years. Commissions are only being granted for the duration of the war.

Men who are accepted as pilots or observers are all entered in the rank of Sergeant Pilot, with one exception mentioned below. They might be described as entering the Royal Air Force Volunteer Reserve. Only at the end of their course of training are they granted commissions if thought suitable for such a distinction.

Men who wish to get into the air fall into three classes. First there are the men who are called up in their age group by the Ministry of Labour. A man so called up can express a preference for joining the Royal Air Force rather than the Army. If expressing that preference he will be accepted according to the numbers needed and, of course, subject to suitability in medical and other respects.

The second class consists of the men who want to volunteer and not wait to be called up in their age class by the Ministry of Labour. These men must go to a recruiting centre. These centres now cater for all the three fighting services. At the centre a representative of the Ministry of Labour will tell a man if he belongs to a reserved occupation. If not, he will be passed on to the R.A.F. representative who will instruct him in the steps to take. At the moment the greatest need of the R.A.F. is for skilled tradesmen, but some are also required for flying duties. This position may alter as time goes on, and certainly it will be necessary to take in a large number of men for flying duties before the war is over. Those who apply for the Royal Air Force should not overlook the possibilities of openings as observers. At present the majority of people seem to wish to become pilots, but the duties of an observer are equally important.

The third class consists of pilots of experience between the ages of 28 to 48 (or in exceptional circumstances under 28) who may be accepted for instructional duties. They will receive commissions for the duration of the war. Men who desire these commissions should apply to the Air Ministry (S.7.e), Adastral House, Kingsway, London, W.C.2.

The only direct commissions which will be granted will be to men who hold the proficiency certificate of one of the University air squadrons. They should apply to the Air Ministry (S.7.e), as above and ask for Form 1020, which they should fill in and forward as directed. There is only a limited number of men so qualified.

Training Courses

All men accepted as Sergeant Pilot or Sergeant Observer will go through the course of training which was described in the last issue of *Flight*. That is to say, they will be passed through an Initial Training Wing, an Elementary and Reserve Flying Training School, and, finally, a Royal Air Force Flying Training School. At the end of the last-mentioned course, a certain number of commissions for the duration of the war will be granted.

Conditions are different for the Fleet Air Arm. The Admiralty is not offering commissions for the duration of the war, but all ordinary entries are still going on. Men can still obtain commissions in the "A" branch of the Royal Navy, when they undertake to serve for seven years with eight more on the reserve. Commissions are also being given in the Royal Naval Volunteer Reserve (Air Section). Applicants for commissions in the Navy should apply to the Admiralty, C.W. Branch. Officers of the "A" branch of the Navy are taught to fly at the appropriate flying training school managed by the Royal Air Force. The Air Section of the R.N.V.R. will probably be employed on transport and communication duties, but we understand that commissions in this Service are only granted to men with a considerable number of flying hours to their credit.

Commercial Aviation and the War

AFTER interruptions, transfers of routes, changes of terminal location and other unpleasant but possibly necessary methods of guarding the safety of commercial aircraft flying on their lawful occasions, there seems to be a tendency towards a resumption of air services at home and elsewhere. It is reported that the Stockholm-Berlin-Rome service is to be re-opened, and the Danish-German service is also about to start again.

At home there will be a resumption of the London-Paris air service, which will be operated jointly by Imperial Airways and Air France.

On October 5 the Postmaster-General announced that air mail services *via* France to North and West Africa, South America and French Indo-China would be resumed at the air postage rates formerly charged for first-class mail, with the exception of the following new rates:

To Argentine, Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay—5s. per half ounce; postcards, 2s. 6d.

To Brazil—4s. 6d. per half ounce; cards, 2s. 3d.

To Gambia and Sierra Leone—1s. 3d. per half ounce; cards, 7d.

First-class mail consists of letters and postcards. There is no reduced air postage rate for second-class mail, which consists of printed and commercial papers, samples, and small packets.

Another North Sea Service

IN addition to that operated by British Airways every week, A.B. Aerotransport and Det Norske Luftfartselskap, the Norwegian airline company, are also planning a combined service to connect this country with Scandinavia.

In present circumstances it is neither safe nor politic to give the names of the arrival and departure points on either side of the sea, but representatives of both companies have been over here to make the necessary arrangements. Up to this moment the Air Ministry has not yet seen fit to re-issue permission to K.L.M. and S.A.B.E.N.A. for the operation of their European services from this country, but it is reasonable to suppose that such permission may duly be granted.

WHAT IS IT? In response to numerous requests we have issued the recognition drawings of German military aircraft, published in our issue of September 14, in the form of a stiff chart, 15½in. × 12½in., ready for hanging. Copies can be obtained from our offices, price 6d. (postage 2d. extra).

LOW APPROACH : Thanks to its slots and flaps the Handley Page Hampden can be operated from small aerodromes. A pair of Hampdens are seen approaching low with a Miles Magister in the foreground.

Casualties

THE Air Ministry regrets to announce the following casualties on various dates:—

KILLED IN ACTION.—Cpl. R. W. Ewens, A/C. 1st Class D. J. John, A/C. 1st Class W. A. Soanes.

WOUNDED IN ACTION.—Flt. Sgt. F. H. Stubbs, Sgt. J. Vickers.

KILLED ON ACTIVE SERVICE.—Acting P/O. F. A. Bishop, Sgt. J. M. C. Bryden, A/C. 1st Class G. H. Butler, Acting P/O. E. A. Cummings, Sgt. A. B. Greensides, L.A/C. A. B. Hayes, P/O. D. Hill, A/C. 2nd Class R. Malcolm, Sgt. B. Mullin, Acting P/O. J. Ralph, Acting Flt. Lt. G. P. Robinson, P/O. A. S. C. Rose, P/O. H. Rosofsky, P/O. the Hon. P. G. A. St. Clair-Erskine, F/O. J. A. B. Somerville, L.A/C. A. R. R. Stewart.

MISSING.—A/C. 1st Class J. Anthony, A/C. 1st Class A. Bathgate, A/C. 1st Class J. R. Bell, A/C. 2nd Class R. V. Britton, Acting Wing Cdr. I. McL. Cameron, Wing Cdr. J. C. Cunningham, Sgt. R. L. Galloway, F/O. H. D. Green, A/C. 1st Class H. Liggett, A/C. 2nd Class J. Moss, Sgt. J. Pearce, L.A/C. R. F. Petts, P/O. J. R. Saunders, A/C. 1st Class F. J. Soffe, F/O. D. A. Strachan, P/O. G. W. Sutton, A/C. 1st Class A. Thompson, P/O. Roger Turner, Acting Sgt. C. G. Williams.

DIED ON ACTIVE SERVICE.—A/C. 2nd Class F. A. Bowyer, A/C. 2nd Class B. P. Collins, A/C. 1st Class H. S. Gray, L.A/C. R. Pontey, A/C. 1st Class J. J. Walsh, A/C. 1st Class F. W. Wanstall, Flt. Lt. G. S. White.

PREVIOUSLY REPORTED "MISSING," NOW REPORTED KILLED IN ACTION.—P/O. G. W. Brant.

CORRECTION TO COMMUNIQUE No. 3 (published on October 3).—WOUNDED ON ACTIVE SERVICE.—For P/O. G. A. Lane read P/O. J. G. Lane.

Royal Air Force Gazette

Air Ministry, October 3

Royal Air Force

The following Flight Lieutenants are granted permanent commissions in that rank on the dates stated:—H. V. Alloway (Sept. 1); D. G. H. Spencer (Sept. 22).

The following Flight Cadets, having successfully passed through the Royal Air Force College, Cranwell, are granted permanent commissions as Pilot Officers (July 29):—H. D. Atkinson, J. S. Barnwell, C. V. Beadon, W. Beringer, J. B. Boys-Stones, J. W. Carmicheal, P. E. A. Carr, J. Child, P. W. Cook, D. H. T. Dowding, M. H. Franklin, P. L. Gordon-Dean, C. I. D. Halliday, G. F. Harding, R. E. Harris, R. V. Herbert, J. B. Holgate, B. Howe, P. A. Hughes, H. S. P. Hulton, P. A. Kimpton, R. B. Knowles, M. D. Lyne, B. G. Mace, R. F. Martin, J. H. K. Parvin, V. J. Pattison, J. E. Preston, H. C. Randall, J. Seeds, T. N. Stack, J. M. Taylor, J. Tillett, J. D. Willis, J. E. R. Wood. (Substituted for notification in *Gazette* of September 19 concerning these officers); A. Bouwens (September 9).

The following are granted short-service commissions as Acting Pilot Officers on probation for four years on the active list (September 18):—R. H. M. Anderson, R. I. Armstrong, K. Ballas-Andersen, J. N. Bethell, C. N. Buist, C. R. Bush, J. C. Cairns, A. F. C. Carson, R. W. H. Carter, P. J. Coleson, A. P. Cranswick, T. H. Creed, W. H. Culling, B. A. Davidson, J. C. Davidson, E. L. Davies, L. R. Evans, R. L. Flewelling, C. R. Glen, D. Hankins, R. A. Hanks, F. C. Harrold, W. D. Hermon, D. O. Hobbis, G. R. Holyoke, H. W. Jones, A. S. Judson, J. Kee, I. C. Kirk, A. V. H. Laursen, J. H. C. Lewis, I. F. Lothian, G. L. MacIntyre, J. C. Mallon, W. H. Millington, H. Paynter, F. T. Poole, R. W. Pryor, J. K. Punshon, J. D. Ready, G. M. Rothwell, R. M. Sanderson, J. L. Scott, D. J. T. Sharp, C. W. H. Thomson, I. D. Thow, J. S. Torgalson, H. C. Winter-Taylor, G. R. Wooll.

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation on the dates stated:—(November 29, 1938) W. E. Bowden, L. L. Jones, I. O. O'Neill, C. E. L. Powell, C. V. Winn; (December 6, 1938) M. S. Ferguson, H. T. Gilbert; (January 17) W. Bunting, C. R. Frankish, W. S. Munday, R. Thynne; (April 4) N. I. C. Francis, G. S. C. Holliday, E. P. Phillips; (April 6) E. A. Cummings (since deceased); (April 15) W. D. Matthew; (May 16) C. A. Connor, J. Cruttenden, G. J. C. Hogan, I. G. G. Potts; (June 10) M. P. C. Holmes; (June 27) F. N. Clouston, P. L. Parrott; (July 25) K. V. Gilling, D. L. Gould, C. J. Hitch, W. M. R. Smith, T. J. S. Warren; (August 29) A. Barkley, B. Finucane, A. S. Jackson, R. Kidson, R. Lambert, J. A. E. Monette, T. L. Patterson, G. A. C. Rhind, A. H. J. Ryan, K. G. Taylor.

The following Pilot Officers on probation are confirmed in their appointments on the dates stated:—(February 28) L. L. Jones, I. O. O'Neill, C. E. L. Powell, C. V. Winn; (March 6) M. S. Ferguson, H. T. Gilbert; (April 17) W. Bunting, R. Thynne; (May 29) W. E. Bowden; (July 4) N. I. C. Francis, E. P. Phillips; (July 15) W. D. Matthew (July 17) C. R. Frankish, W. S. Munday; (August 2) G. S. C. Holliday; (August 16) C. A. Connor, J. Cruttenden, G. J. C. Hogan, I. G. G. Potts; (September 17) A. R. Densham; (September 27) F. N. Clouston, P. L. Parrott.

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation and confirmed in their appointments on the dates stated:—(May 30) G. H. Jackson; (June 27) G. E. Walker; (July 25) H. T. Smith; (August 5) R. G. Wigg; (August 29) M. Fortnum, G. H. Pemberton, A. Watson; (September 2) E. J. Wicht.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—(July 23) (seniority July 1, 1937) K. B. F. Smith (Acting Flight Lieutenant); (August 25) R. W. G. Kitley (Acting Flight Lieutenant); (August 29) A. W. Fletcher.

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—G. P. Gibson (June 16); A. L. H. Barber (June 22); M. T. Kirkwood (July 12); J. Dunn, R. H. Immelman (July 21); I. U. McR. Gallaway (August 16); V. H. Ayres (August 21); F. Carey (August 28); D. Hayley Bell, T. N. Linley (September 1).

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—B. R. O'B. Hoare (May 1); C. B. B. Wallis (July 19); W. M. H. Brookes (July 28); W. K.

Williams (August 10); J. Paine (August 22); B. J. Rogers (August 24); A. M. G. Lywood (August 26); M. R. Atkinson (August 29); P. Corbishley (September 1).

The following Pilot Officers are granted the acting rank of Flight Lieutenant on the dates stated:—G. B. Walford (August 1); W. J. M. Longmore (August 18).

F/O. H. J. A. Thewles relinquishes the acting rank of Flight Lieutenant (August 10); P/O. H. K. Gibson (since resigned) takes rank and precedence as if his appointment as Pilot Officer bore date August 10, 1938, reduction to take effect from June 1; P/O. S. C. Holbrow takes rank and precedence as if his appointment as Pilot Officer bore date June 6, 1938, reduction to take effect from September 4; P/O. R. J. MacDonogh takes rank and precedence as if his appointment as Pilot Officer bore date December 21, 1938, reduction to take effect from August 18th (substituted for notification in *Gazette* of September 12); Sqn. Ldr. B. S. Nicholl relinquishes his short-service commission on transfer to the Royal New Zealand Air Force (September 18); Acting Pilot Officer on probation B. C. Lytton relinquishes his short-service commission on account of ill-health (September 29).

The short-service commissions of the following Acting Pilot Officers on probation are terminated on cessation of duty on the dates stated:—A. R. G. Harvey, J. R. H. Morton (September 29); H. E. D. Marryat (October 1).

P/O. N. E. R. Wilkes is cashiered by sentence of General Court-martial (July 31); F/O. J. N. Culverwell is dismissed the service by sentence of General Court-martial (August 19); P/O. G. T. Rhodes is dismissed the service by sentence of General Court-martial (September 26); P/O. E. N. Taylor is dismissed the service by sentence of General Court-martial (September 26). The notification in the *Gazette* of September 27, 1938, concerning P/O. I. B. N. Russell is cancelled.

Equipment Branch

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—P. H. Stibbs (April 14); B. O. Cannon (July 10); J. E. Garwood (August 1).

Commissioned Engineer Officers

W/O. E. T. Beadle is granted a commission as Flying Officer on probation with effect from August 15 and with seniority of June 12; F/O. F. C. Whenman is promoted to the rank of Flight Lieutenant (April 14).

Commissioned Signals Officer

W/O. G. H. F. Hurst is granted a commission as Flying Officer on probation with effect from August 26 and with seniority of June 12.

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

F. G. Ferrier is granted a commission in Class A as Flying Officer with effect from September 19 and with seniority of March 22, 1932.

The following are granted commissions in Class CC in the ranks and on the dates stated:—

Squadron Leaders.—E. M. Thompson (May 22); Sqn. Ldr. G. R. Hicks, D.F.C. (R.A.F.O.) (July 17).

Flight Lieutenants.—Maj. J. G. P. Drummond, M.C. (I.A., Ret.); F/O. J. V. Roberts (July 26); Lt. A. D. S. Steele (R.A.R.O.) (August 30).

Flying Officer (Acting Flight Lieutenant).—F/O. C. J. Pooley (R.A.F.O.) (July 27).

Flying Officers.—A. H. S. Browne (August 4); Lt. D. Drummond-Hay (R.A.R.O.) (August 28).

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 28):—J. R. Brown, D.F.C., R. O. O. Taylor, W. L. Bateman, G. L. G. Richmond, E. S. Osborn.

Flt. Lt. R. D. S. Reid relinquishes his commission on cessation of duty (August 28); Flt. Lt. S. H. Woolf relinquishes his commission on cessation of duty (September 18); F/O. J. S. Hall relinquishes his commission on appointment to a commission in the Royal Air Force Volunteer Reserve (August 13).

Royal Air Force Volunteer Reserve

General Duties Branch

J. S. Hall is granted a commission as Flying Officer with effect from August 13 and with seniority of February 13, 1936.

The following are granted commissions as Pilot Officers (September 26):—Sgt. J. G. I. Acheson, Sgt. H. Arnott, Sgt. C. H. Bacon, Sgt. J. R. A. Bailey, Sgt. J. J. F. H. Bandinel, Sgt. I. N. Bayles, Sgt. J. R. Bufton, Sgt. A. E. Cook, Sgt. H. H. Eccles, Sgt C. D. Gilliat, Sgt. P. Howes, Sgt. W. R. A. Knocker, Sgt. J. W. Lund, Sgt. M. J. P. Martin, Sgt. P. F. Mayhew, Sgt. J. R. H. Merifield, Sgt. P. F. Miles, Sgt. R. McE. Mottram, Sgt. M. L. Patton-Bethune, Sgt. R. D. Taylor, Sgt. L. R. de M. Thompson, Sgt. R. P. C. Thompson, Sgt. D. Warburton, Sgt. P. G. A. Watson, Sgt. E. J. A. Williams, R. Boyfield, P. Ross-Frames Burton, D. E. S. Charles, J. L. Halstead, H. H. C. Holderness, R. W. G. Holdsworth, R. W. King, G. E. Milnes, G. H. Nelson Edwards, M. O. Weizmann.

Brigadier-General J. V. Campbell, V.C., C.M.G., D.S.O., is appointed Honorary Flight Lieutenant (August 28).

Administrative and Special Duties Branch

P. R. C. Groves, C.B., C.M.G., D.S.O., is granted a commission for the duration of hostilities as Group Captain with the honorary rank of Air Commodore (September 21); L. F. Blandy, C.B., D.S.O., is granted a commission for the duration of hostilities as Group Captain (September 14); Sir Patrick Hastings, K.C., is granted a commission for the duration of hostilities as Squadron Leader (September 25); J. B. Beck is granted a commission for the duration of hostilities as Flight Lieutenant (September 20); A. W. Simon is granted a commission for the duration of hostilities as Pilot Officer with the acting rank of Flight Lieutenant (paid) (September 22); L. G. Crawley is granted a commission for the duration of hostilities as Pilot Officer (September 20); C. H. Sleightholme is granted a commission for the duration of hostilities as Pilot Officer on probation with the honorary rank of Squadron Leader (September 2

The following are granted commissions for the duration of hostilities as Pilot Officers on probation with the honorary rank stated (September 26):—

Squadron Leaders.—W. K. Birch, O.B.E., A. B. Fanstone, A.F.C.

Flight Lieutenants.—F. Abbott, T. J. D. Craig, R. W. Francis, A. W. S. Franklin, A. C. John, A. T. Mathews, J. E. Mills, G. W. Stevens.

Flying Officers.—T. P. Cleary, J. Deller, K. R. Gilbert, P. J. E. Hills, W. F. G. Hutchings, F. C. Lill, J. Pritchett, C. D. Short.

The following are granted commissions for the duration of hostilities as Pilot Officers on probation on the dates stated:—G. M. J. Hickman (August 20); K. J. G. Bartlett (August 27); G. N. H. Perry (August 29); B. E. Bishop (September 1); J. R. Pearson (September 2); Lord Auckland, H. O. N. Bull, C. A. Reilly, E. D. Ridley (September 3); F. D. Taylor (September 4); H. H. Bolitho, D. Garnett, K. S. Innes, W. T. S. Williams (September 20); M. D. M. Cochrane (September 22); V. Muirhead (September 25); J. B. Acres, A. L. Aldridge, P. Allden, H. W. Allen, N. J. Allgood, C. G. Allman, F. Ambler, A. W. Amson, A. J. Ansell, C. H. Anster, J. E. G. Archibald, W. H. Ashbee, F. R. Atkinson, F. Badham, A. C. Baker, K. F. Balmain, C. G. Barker; S. A. Barnett, W. E. J. Barry, D. C. Beadell, C. O. Bean, F. W. L. C. Beaumont, R. F. Beddow, C. H. Beech, N. J. Bengough, H. D. Benham, S. L. Bennett, F. H. Bickerton, P. W. Bingham, J. Blackmore, C. L. Blake, H. Blatherwick, J. F. Blick, J. Blomley, J. R. S. Borman, P. Boulton, D.F.C., H. P. Bowring, M. E. Bradley, H. G. Bradshaw, C. P. Brady, W. L. Brewer, J. L. Brown, A. R. Browne, H. Buie, R. J. Bunning, P. V. Burton, H. A. Buss, O.B.E., D.S.C., P. P. Butters, R. Caldecott, F. Carr, S. H. Cary, J. E. H. Chadwick, P. R. Clapham, A. C. Clark, H. E. Clark, W. G. Clarke, W. E. Clarkson, S. W. Cobb, G. P. Collier, S. H. Coventry, W. S. Cox, L. E. Crawley, H. E. Craymer, C. N. B. Crisp, L. B. Crough, C. C. A. Daniel, A. N. David, W. Davies, G. W. Davis, A. H. Day, D.F.C., W. H. Dean, W. S. Dean, H. Dear, G. W. Delaney, J. T. Denman, C. E. Dennison, C. N. Dilly, G. E. O. Dixon, F. W. Dodman, D. W. Donaldson, T. Dootson, P. W. Douglas, M. H. Drake, H. H. Duckett, J. Duncan, G. T. Dunstan, S. R. Durdin, J. O. Durham, R. H. Durnan, H. C. Edenborough, M. W. Edwards, H. Entwisle, L. A. Evans, L. J. Evans, P. W. Evans, L. R. Evershed, R. L. Farley, W. S. Featherstonhaugh, E. R. Fell, H. McL. Ferguson, C. Fletcher, E. Fletcher, L. J. Fletcher, H. G. Ford, W. G. Foulds, D. P. Fulton, A. T. Gammon, O.B.E., M.B.E., T. J. Gardiner, F. Garrett, W. H. Gibson, H. W. Gill, A. H. H. Gilligan, A.F.C., S. G. Glover, D.C.M., E. G. Gough, A. W. E. Gouriet, D. Grant, J. K. Grant, F. H. X. Gwynne, A. G. Harrison, R. C. Hedger, H. S. Hennah, R. H. Humphreys, A. F. F. Jacob, D.S.O., J. Jameson, L. G. Jonas, A. K. H. Jones, G. de Jongh, F. A. Kemp, H. de V. Leigh, D.F.C., J. J. Lister, P. P. Love, J. J. Mackenzie, the Rt. Hon. W. T. Whiteley, Lord Marchamley, C. H. Mathias, C. B. B. Maturin, G. V. J. Maxted, D. S. McCulloch, M. L. D. Metcalfe, R. C. Michaelson, W. E. Newman, J. A. Norris, W. Parkinson, H. R. Patton, W. Pollok, L. A. T. Pritchard, M. C. Radford, A. W. Robinson, A. E. T. Robinson, H. Rodger, C. E. Rogers, W. Ronald, S. E. Rowley, J. J. B. Rutter, F. Samuel, J. A. Saward, F. H. Schofield, W. W. Scott, M. G. Scroggie, T. H. Seymour, A. C. P. Seymour-Higgins, H. F. Shrimpton, H. Slaney, A. G. Smalley, B. Smith, B. C. Smith, E. G. Spooner, F. C. Staines, R. D. Stewart, E. D. Stevens, J. C. Stone, C. K. Studd, J. E. T. Sutcliffe, A. J. Swain, E. Swale, D.F.C., E. Sykes, S. L. Symondson, J. E. Tennant, D.S.O., M.C., Sir E. Villiers, R. F. E. Wickham, R. Williamson, S. C. Williamson, R. H. Windsor, R. W. S. Wyllie, O.B.E., W. Yonge (September 26).

C. M. D. Eales is granted a commission for the duration of hostilities as Pilot Officer on probation (September 1). (Substituted for notification in *Gazette* of September 19.)

The following Pilot Officers on probation are confirmed in their appointments and promoted to the rank of Flying Officer on the dates stated:—G. C. Heseltine (June 3); W. H. E. Burton (August 30); F. Allen, G. P. Atkins, A. G. Baker, S. H. Bingham, P. A. A. Boss, M. W. Bovill, B. H. Clarke, J. A. Cooper, E. R. Coulson, W. L. H. Davies, E. A. Dennis, J. F. R. B. De Sarigny, O.B.E., H. R. De Wilde, D.F.C., S. Dixon, M. Dodd, F. E. B. Elsbury, A. M. Fitzrandolph, V. J. Fontannaz, H. M. Goode, T. E. T. K. Green, C. D. Griffiths, F. H. D. Hitch, H. E. Hounsell, H. M. Morris, D.S.C., H. A. Stokes (Honorary Squadron Leader) (August 31); W. R. Adkins, L. W. Barney, C. A. B. Beattie, S. P. A. Bousfield, J. F. M. Carruthers, W. E. Cutlan, W. S. Dailey, K. M. Dawson, W. Fallowfield (Hon. Flying Officer), E. S. Farrand, G. Frankau, N. Gibson (Hon. Flight Lieutenant), F. L. Goodacre, R. T. B. Hedges, A. H. Heness, H. V. James, E. P. Kohn-Speyer, H. H. G. Lamb, F. W. Lee, C. M. Leman, M.C., D.F.C., H. W. F. Long, P. Mones, the Marquess of Casa Maury, G. E. T. O'Kill, J. Olorenshaw, H. M. Parsons, S. W. Price, M.C., C. A. Proctor, J. H. Stevens (Hon. Flying Officer), F. E. Tighe, H. T. R. Twyford, W. A. Villiers (September 1); S. Hooper, D. V. D. Marshall, I. O. Morton, J. V. Southon (September 2); C. J. Agelasto, S. H. Bell, H. B. T. Childs, G. M. Emerson, S. D. Felkin, M.B.E., F. W. L. V. Fraser, O.B.E., M.C., M. P. Gurney, H. Haycock, M.C., A. S. Hett, D. C. James, O.B.E., S. W. Lewis, H. H. Mayoh (Hon. Flight Lieutenant), P. A. G. Phillips, C. P. Sheppard, A. M. Wilkinson, D.S.O., H. H. Wood (September 3); B. M. Bell, C. W. Carleton, A.F.C., H. Hill, A. Maybaum (September 4); F. Anderson (Hon. Flying Officer), H. A. Bird, C. M. Maud, D.F.C., K. Ruffe-Thomas,

A. R. Russell (September 5); R. O. Hobhouse, E. Houghton (Honorary Flying Officer), B. Robinson (September 6); R. H. Brown (Honorary Flying Officer), D. S. R. Kent, C. J. Whittle (September 7); J. B. R. Brooke, D. F. Massy, H. E. Twaits, G. L. Wright, D.S.M. (September 8); A. K. Boning, C. C. K. Dagg, A.F.C., D. E. B. K. Shipwright, J. R. Woods (September 9); L. P. D. Cooper, F. L. Kerby-James, A. W. MacIlwaine, A. L. Quance, J. A. Stedman (September 10); S. N. Bourne, A. E. G. Forrest, C. E. Gregory, J. A. McGilley, C. Osenton, A.F.C., G. F. Turberville, A. A. Whorton (September 11); Sir A. L. Beit, Bt., M.P., A. T. Daw, J. B. Knocker, A. R. M. Scrase-Dickins (September 12); P. Freeman (Honorary Flight Lieutenant), D. W. Patston, G. Williams (Honorary Flight Lieutenant) (September 13); R. A. V. Leforgeais (September 14); W. J. Farquharson (September 18); J. J. L. Patterson (September 20).

Equipment Branch

The following are granted commissions for the duration of hostilities as Acting Pilot Officers on probation on the dates stated:—J. R. Armstrong, B. A. W. Baird, D. P. J. Bernard, P. J. Bleeck, A. R. Blunsdon, H. M. Bongard, E. A. Bradly, R. Bradshaw, C. A. W. Carter, D. W. Charles, W. L. B. Cochrane, A. J. Cunningham, A. S. Duff, B. H. Edwards, J. H. T. Fletcher, B. E. Goodwin, R. V. Gray, F. J. P. Haynes, T. W. James, J. B. Jeyes, A. D. R. Jones, F. J. W. Knowles, C. B. Lockerbie, J. W. Lovell, T. H. McCarthy, A. L. Mitchell, G. W. Orrock, W. J. R. Peacock, M. Revill, J. W. Rotheram, H. G. Scott, J. F. Sexton, A. A. Solly, P. J. J. Stellakis, J. B. Stone, L. A. Taylor, D. R. Vickers, C. H. Watson, W. G. Welch, T. R. Williams, P. E. Willson, L. H. Winter (September 18); W. R. Gibbs (September 21).

Medical Branch

The following are granted commissions in the ranks stated (September 18):—

Squadron Leaders.—J. C. Ainsworth-Davis, M.D., F.R.C.S., F.R.C.S.(E); R. R. Trail, M.C., M.D., Ch.B., F.R.C.P.

Flight Lieutenants.—G. Gray, M.R.C.S., L.R.C.P., D.A.; D. J. Williams, M.D., Ch.B., M.R.C.P.

Flying Officers.—R. J. Healy, M.R.C.S., L.R.C.P.; D. D. Reid, M.B., Ch.B.; J. A. Sinclair, M.R.C.S., L.R.C.P., L.D.S.; J. Sutcliffe, M.B., B.Chir.

R. T. Goodyear, M.R.C.S., L.R.C.P., is granted a commission for the duration of hostilities as Flying Officer (September 19).

Dental Branch

The following are granted commissions as Flying Officers (September 6):—E. J. Dunford, L.D.S., W. H. Phillips, L.D.S.

The following are granted commissions for the duration of hostilities as Flying Officers (September 18):—B. E. Greenfield, L.D.S., L. James, L.D.S., J. McAra, L.D.S., S. W. Pearks, L.D.S., P. White, L.D.S.

Chaplains Branch

The following are granted commissions for the duration of hostilities with the relative rank of Squadron Leader on the dates stated:—The Rev. B. E. Knight, M.A. (September 8); the Rev. T. I. Robinson, B.A. (September 14); the Rev. W. H. Fowke, the Rev. W. W. C. L. Orpwood, M.A. (September 15); the Rev. W. R. Davies (September 20).

Auxiliary Air Force

General Duties Branch

Flt. Lt. E. M. Thompson relinquishes his commission on appointment to a commission in the Reserve of Air Force Officers (May 22).

No. 612 (County of Aberdeen) Squadron.—R. M. Nisbet is granted a commission as Pilot Officer (July 2). No. 613 (City of Manchester) Squadron.—J. G. L. Haigh is granted a commission as Acting Pilot Officer on probation (September 1). No. 614 (County of Glamorgan) Squadron.—P/O. R. Robarts-Arnold relinquishes his commission (August 1). No. 902 (County of London) Squadron.—F/O. C. E. Harvey is promoted to the rank of Flight Lieutenant (August 4). No. 905 (County of Surrey) Squadron.—The following are promoted to the ranks and on the dates stated:—*Flight Lieutenant.*—P/O. F. K. R. Coldstream (August 29). *Flying Officer.*—Acting P/O. Sir A. E. W. Weldon, Bt. (April 15). No. 911 (County of Warwick) Squadron.—The following Acting Pilot Officers are promoted to the rank of Flight Lieutenant on the dates stated:—R. Hooley (June 9); E. S. Rickards (June 12). No. 912 (County of Warwick) Squadron.—The following Acting Pilot Officers are promoted to the rank of Flight Lieutenant on the dates stated:—T. E. H. Grove, D.S.C. (June 7); W. H. R. Lloyds, M.C. (June 8). No. 913 (County of Warwick) Squadron.—R. B. Hawkes is granted a commission as Acting Pilot Officer on probation (August 23); P/O. R. G. E. Mayo is promoted to the rank of Flight Lieutenant (June 6); Acting P/O. E. S. Rickards is transferred to No. 911 (County of Warwick) Squadron (June 12). No. 914 (County of Warwick) Squadron.—R. P. Garner is granted a commission as Acting Pilot Officer on probation (August 29); Acting P/O. G. E. S. St. Johnston is promoted to the rank of Flying Officer (August 10). No. 915 (County of Warwick) Squadron.—The Rt. Hon. the Earl of Dudley, T.D., D.L., is appointed Honorary Air Commodore (October 3). The following are granted commissions as Acting Pilot Officers on probation (August 29):—B. G. Dewsbury, H. S. Wilkinson; Acting P/O. R. L. Huins is promoted to the rank of Flying Officer (May 3). No. 916 (County of Warwick) Squadron.—Acting P/O. R. A. Corbett is promoted to the rank of Flying Officer (May 4). No. 922 (West Lancashire) Squadron.—The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers (September 7):—M. Brooking, R. Godfrey, F. R. Terras. The following are promoted to the rank of Flying Officer (September 7):—*Pilot Officer.*—T. F. Garside. *Acting Pilot Officers.*—C. L. S. Cornwall-Legh, J. H. Musker, R. J. S. Martin. No. 923 (West Lancashire) Squadron.—Acting Pilot Officer on probation J. L. Addleshaw is confirmed in his appointment and graded as Pilot Officer (September 7). The undermentioned Acting Pilot Officers are promoted to the rank of Flying Officer (September 7):—M. A. H. Bellhouse, J. W. Huggins, A. Walker, R. F. Armitage. No. 931 (Hampshire) Squadron.—A. M. D. Pitt is granted a commission as Acting Pilot Officer on probation (August 30).

Equipment Branch

No. 918 (County of Derby) Squadron.—T. I. Etridge is granted a commission as Pilot Officer (September 1). No. 926 (East Lancashire) Squadron.—H. V. Newton is granted a commission as Pilot Officer (August 29).

Accountant Branch

No. 918 (County of Derby) Squadron.—R. F. Gould is granted a commission as Pilot Officer (September 2). No. 924 (East Lancashire) Squadron.—P. Nuttall is granted a commission as Pilot Officer (August 24). No. 926 (East Lancashire) Squadron.—A. E. Armitage is granted a commission as Pilot Officer (August 29).

Medical Branch

No. 910 (County of Essex) Squadron.—E. C. Dayus, M.R.C.S., L.R.C.P., is granted a commission as Flying Officer (August 29). No. 933 (County of Hampshire) Squadron.—G. H. Duthie, M.B., Ch.B., is granted a commission as Flying Officer (August 26).

Erratum

In the *Gazette* of July 11 notification concerning Maj. R. E. Wilson, M.C. For June 29, 1939, read June 12, 1939.

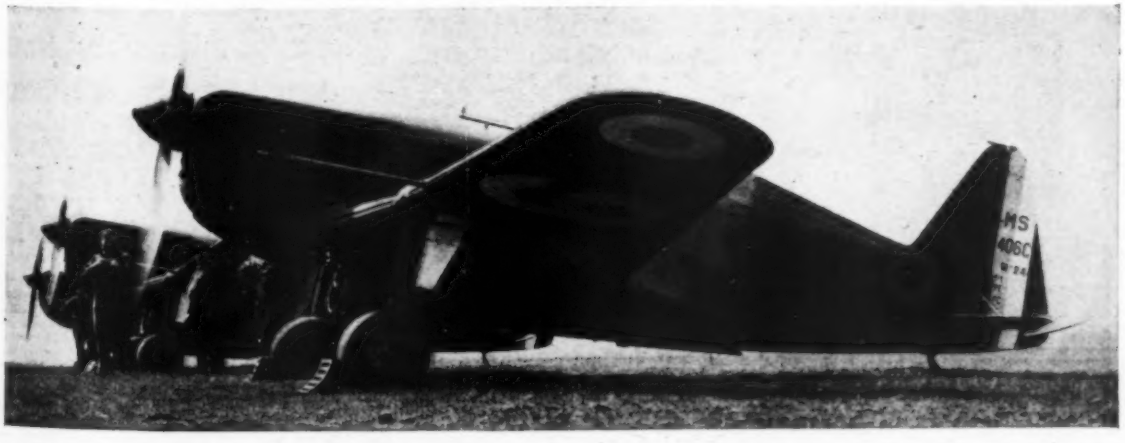
Women's Auxiliary Air Force

Mrs. Kathleen Van Baerle is appointed in the rank of Company Commander (August 24).

Air Ministry, Oct. 6

Miss S. J. Burnett is appointed Company Cdr. with effect from June 28 and with seniority of March 1; Miss M. Y. Harvey is appointed as Company Asst. with effect from June 28 and with seniority of June 6.

The following are appointed Company Assts. (September 25):—Mrs. A. Bowes, Miss A. F. M. Magee, Miss W. M. Overton.



THE MODERN MORANES: During the war 1914-18 the name Morane was something to conjure with. Now the French Air Force is using large numbers of Morane 406 single-seaters with Hispano-Suiza 12Y *moteur canon*. Three of these machines are shown.

THE INDUSTRY

Convertible Welders

AVIATION CORPORATES, LTD., send us particulars of the Harvey Convertible Spot and Seam Welders for which they are the agents in this country. Model 107 has a throat depth of 36in., and both upper and lower arms have a considerable range of movement to facilitate work on thick or awkwardly shaped sections. The lower arm may be hydraulically raised or lowered 18in. and rotated both horizontally and axially through 90 deg. A force of up to 1,150 lb. can be applied to the electrodes.

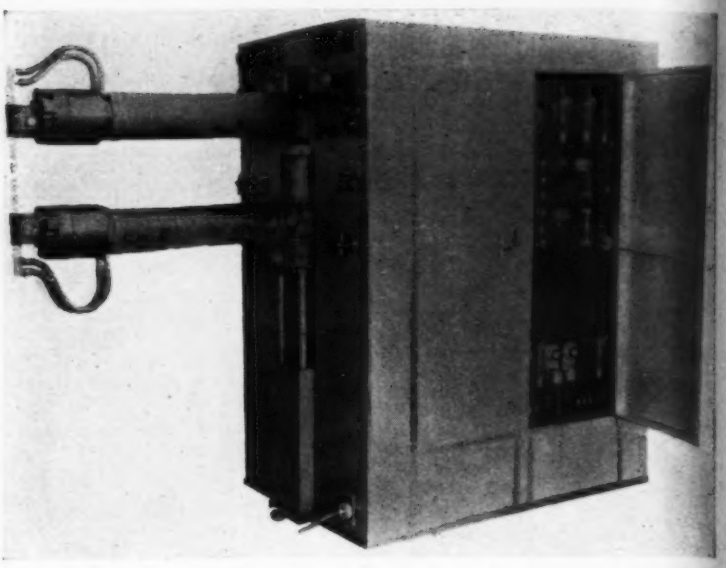
Operation is controlled by a three-position foot switch of the positive snap type. The first position brings the upper electrode down on the work, and the second closes the timing circuit which, in turn, makes the weld. The third position is used only when the machine is converted to a roll or seam welder, when rates of from three to twelve feet per minute can be obtained.

The timing circuit is interlocked, so that it is impossible for the current to flow until full pressure is applied to the electrode, and the upper arm is released after a definite time period to ensure consistency of welds.

It is impossible to obtain a second impulse in the welding circuit without releasing the foot switch and repeating the cycle of operations. Automatic operation from 0.6 to 6 seconds may be effected by the use of a transfer switch on the front panel.

Units are made in all capacities from 100 to 400 kVA, but machines of special capacity can be produced to meet any particular requirements.

The address in England is Aviation Corporates, Ltd., Ariel House, 1, Royal Mansions, Henley-on-Thames, Oxford.



When used as a spot welder, the Harvey will do up to 45 spots per minute.

Dust Extraction

THE name of E. H. Jones (Machine Tools), Ltd., is sufficient guarantee of the quality of the new Phœnix Dust Extractor which has just been placed on the market. It is a development of their original Dust Extractor Unit, which was for general use, and is specially designed to handle very light swarf of materials such as Bakelite, Erinoid and other synthetics. The unit is completely self contained. An electric suction fan draws the dust over a system of six baffle plates which separates a large percentage of the heavier dust, the finer particles being removed as the cleaned air passes out through a triple canvas filter. For ultra-light dust a special dust collection bag takes the place of the baffles and filter. The unit is fitted with castors for ease of movement to required position.

The makers inform us that considerable stocks of this unit are available at their London and Midland showrooms, the addresses of which are The Hyde, Edgware Road, Hendon, N.W.9, and 14, Florence Street, Birmingham.

The Phœnix Dust Extractor handles light swarf.

PUBLICATIONS RECEIVED

Die Zusammenarbeit des Luftverkehrs mit Anderen Verkehrszweigen, by Dr. Hans Altmann; Junker and Dunnhaupt Verlag, Berlin, Germany.

National Advisory Committee for Aeronautics: Report No. 652: Air Flow in the Boundary Layer of an Elliptic Cylinder, by G. B. Schubauer; 10 cents. No. 653: A Study of Air Flow in an Engine Cylinder, by D. W. Lee; 10 cents. No. 654: General Airplane Performance, by W. C. Rockefeller; 10 cents. No. 658: Tests of Two Full-scale Propellers with Different Pitch Distributions, at Blade Angles up to 60 deg., by D. Biermann and E. P. Hartman; 10 cents. Superintendent of Documents, Washington, D.C., U.S.A.

Aeronautical Research Committee Reports and Memoranda: No. 1846: The Vibration of Airscrew Blades: Extension of the Theory given in R. and M. No. 1758, by B. C. Carter; 1s. 3d. No. 1848: The Principles of the Galerkin Method, by Prof. W. J. Duncan; 3s. 6d. No. 1851: Simple Experimental Analysis of the Stresses in Rings, by Prof. A. J. S. Pippard and S. R. Sparkes; 2s. 6d. No. 1852: Profile and Skin-Friction Aerofoil Drags, by A. Fage; 3s. 6d. No. 1853: Further Development of a High-Speed Wind Tunnel of Rectangular Cross-Section, by A. Bailey and S. A. Wood; 2s. 6d. No. 1856: Qualitative Experiments on "Reed Oscillation" of Elevators, by Prof. W. J. Duncan and W. Barnard; 9d. No. 1858: Longitudinal Flow in a Trailing Vortex, by W. F. Hilton; 1s. H.M. Stationery Office, York House, Kingsway, London, W.C.2.

Second Progress Report of the Research Committee, 1939: The Institute of Welding, 104, Victoria Street, London, S.W.1.

The Defence of Britain, by Liddell Hart; 12s. 6d., Faber and Faber, Ltd., 24, Russell Square, London, W.C.1.

First Steps in Machine Drawing and Design, by L. A. Johnson; 1s 6d. Pitt's Popular Publications, 56, Talfourd Road, London, S.E.15

Aeronautical Research Committee Reports and Memoranda: Report No. 1843: Experiments on the Transition of the Laminar Boundary Layer on a Flat Plate, by A. A. Hall and G. S. Hislop; 4s. No. 1855: Experiments on a Riveted Wing in the Compressed Air Tunnel, by D. H. Williams and A. F. Brown; 9d. No. 1857: A Possible Form of High Speed Water Channel, by A. M. Binnie; 1s. 6d., H.M. Stationery Office, York House, Kingsway London, W.C.2.

Department of Overseas Trade: Report on Economic and Commercial Conditions in Malaya, by R. B. Willmot; 2s.. H.M. Stationery Office, York House, Kingsway, London, W.C.2.

Souvenir of the Visit of King George VI and Queen Elizabeth to the Works of Short Bros. Rochester and Bedford, Ltd., Rochester, Kent.

Sky Roads of the World, by Amy Johnson; G. W. and R. Chambers, Ltd., 38, Soho Square, London, W.1.

Weather Guide for Air Pilots, by E. L. Eaton; $2.00. The Ronald Press Co., 15, East 26th Street, New York, N.Y., U.S.A.

Flying Simply Explained, by M. Logan; 6d., Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.1.

A Primer of Flying, by G. W. Williamson; 2s. 6d., Sir Isaac Pitman and Sons, Ltd.

Elementi di Aerodinamica e di Dinamica del Volo, by Dr. Ing. Giulio C. Costanzi. Vol II. Editoriale Aeronautica, Viale Libro E Moschetto, 6. Rome, Italy.

Wind, Sand and Stars, by A. de St. Exupery. 10s. 6d., William Heinemann, 99, Great Russell Street, London, W.C.1.

Unsolved Mysteries of the Arctic, by Vilhjamur Stefansson; 10s. 6d., George G. Harrap and Co., Ltd., 182, High Holborn, London, W.C.1.

National Advisory Committee for Aeronautics: Report No. 650: The Aerodynamic Characteristics of Six Full-scale Propellers Having Different Airfoil Sections, by D. Biermann and E. P. Hartman; 10 cents. Report No. 655: The Knocking Characteristic of Fuels in Relation to Maximum Permissible Performance of Aircraft Engines, by A. M. Rothrock and A. E. Biermann; 10 cents. Report No. 656: The Column Strength of Two Extruded Aluminium-Alloy H-Sections, by W. B. Osgood and M. Holt; 10 cents.

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